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Electric Railway Journal

Volume 57

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Instructions for Use of Index

This index is essentially a subject index, not an index of titles, and articles treating a number of different subjects are indexed under each of them. In addition, a geographical reference is published wherever the article relates to any particular railway company, or to the state matters of any particular state. The geographical method of grouping serves to locate in the index any article descriptive of practices, conditions, events, etc., when the searcher knows the electric railway, city or state to which the article applies. Groupings are made under the name of the city in which the main office of the company is located, but an exception is made in the case of electrified sections of steam railroads, such entries being made direct under the name of the railroad. City or state affairs appear direct under the names of the city or state involved.

In the subject index, the alphabetical method is followed, and if there is a choice of two or three keywords the one most generally used has been selected, cross references being supplied. Below will be found a list of the common keywords used in the index to this volume. This list has been subdivided for convenience into thirteen general subjects, but the general subject headings, shown in capital letters, do not appear in the body of the index unless, like "employees," they appear also in small type. As an example of how to use the index, if a reader wishes to locate an article on special trackwork he would obviously look in the list under the general subject Track and under this caption, only special trackwork could apply to the article in question. The reader would therefore refer to this keyword under S in the body of the index.

In addition to the groups of articles covered by these headings the papers and reports from railway associations are grouped under the names of the various organizations. Proceedings of other associations and societies are indexed in general only in accordance with the subject discussed. Short descriptions of machine tools appear only under the heading "Repair shop equipment" and are not indexed alphabetically, because of the fact that there is a wide choice in most cases of the proper keyword to be used.

CLASSIFIED LIST OF KEYWORDS

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Accidents (including wrecks)
Safety first

CARS AND OTHER VEHICLES

Car design
Cars
Locomotives
Motor buses
Motor cars, Gasoline
Motor trucks
Service and tower wagons
Trackless trolley
Work and wrecking cars

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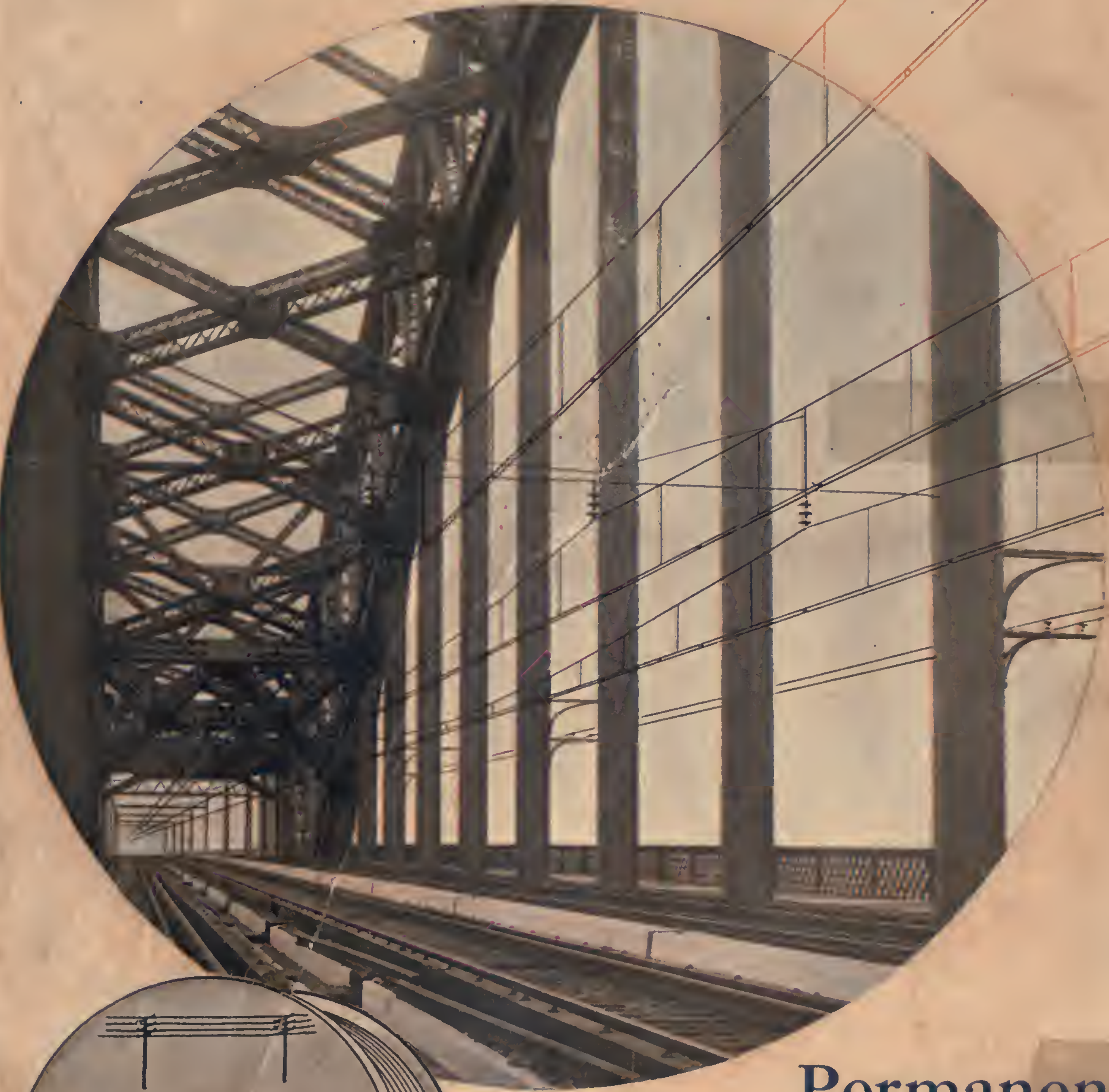

Permanency

was the vital factor in the consideration of overhead for the Hell Gate Bridge, the Gateway to New England from the West.

To the New York, New Haven & Hartford and to the Pennsylvania Railroads, the permanency of Phono-Electric had already been proven because of its ability to transmit energy at 11,000 volts to the locomotives without burning or pitting.

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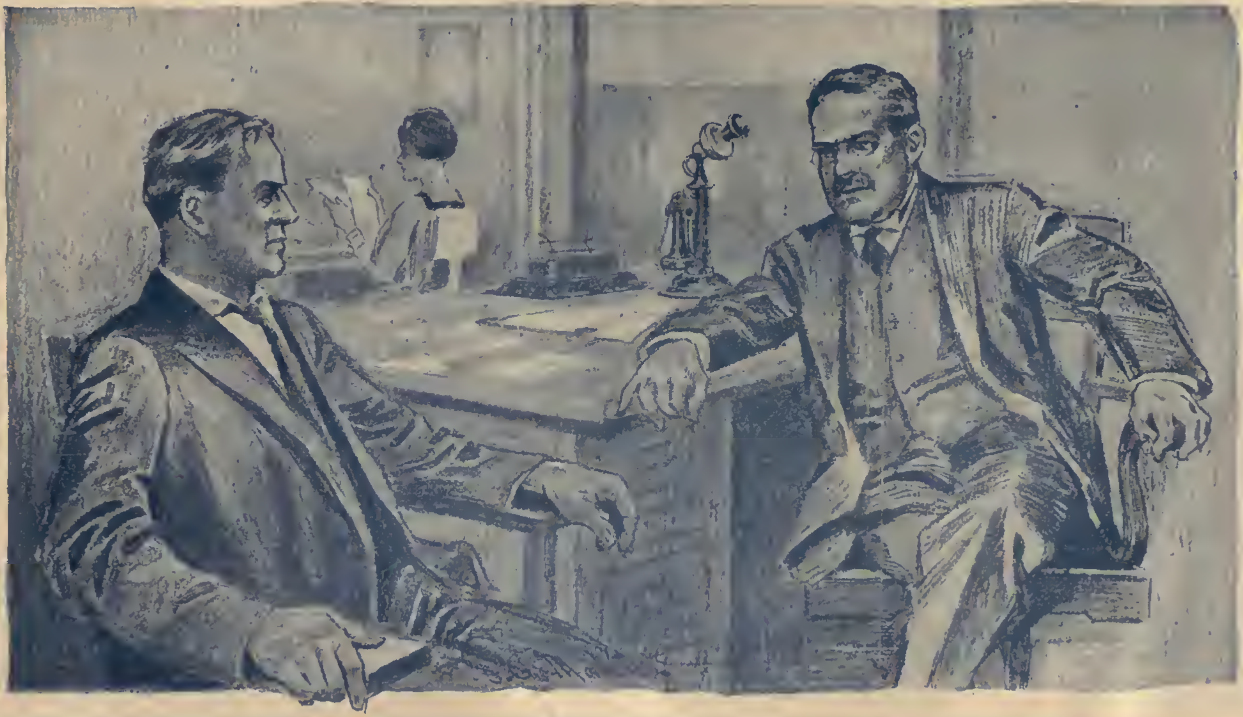

Happy New Year

"Publicity"

"Joe," said the Vice President, "the new year promises to be one of great constructive work in the electric railway industry. We must accomplish our aims during this period, or we shall have many new obstacles to overcome.

"Our national and state public representatives now in power have a better understanding of our problems than ever before. We must back them up and encourage them by doing our part to educate and inform the public with a publicity program of our own.

"The splendid work and success of the Illinois Committee on Public Information, which is giving the people 'facts' and facts only in a way the people generally can grasp, has convinced me that each railway company must actively tie-in with such movements, and do its full share of this work. It's the only way that we can *let the people know and understand our problems.*"

"There is no question about it, Boss," replied Joe. "I have just turned over to the Manager of Public Relations all the items of news and interest from our department for his use in publicity work. I am satisfied it is very helpful to tell the people what our plans are toward improving service. They have a right to know that we have ordered fifty new Peter Witt cars with Westinghouse HL control and motors for delivery in May, as well as sixty safety cars with Westinghouse No. 508 motors.

"I told him to be sure to mention Westinghouse prominently. Every man on the street knows about the wonderful achievements of the Westinghouse Company, and knowing this, will appreciate we are equipping our cars with the best equipment."

"That's a good point, Joe," said the Vice President. "I am going to issue an order asking each department to send in a weekly report, mentioning everything of interest we should try to have published."

Westinghouse Electric & Manufacturing Co.

Sales Offices in All Large American Cities

East Pittsburgh, Pa.

Vol. 57, No. 1 New York, January 1, 1921 Pages 1-66

Electric Railway Journal

HENRY W. BLAKE and HAROLD V. BOZELL, Editors HENRY H. NORRIS, Managing Editor

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Close-hauled Safety Car traffic in the heart of the "Silk City," Paterson, N. J.

"Bungalow" Type Air Compressor

Excellent Performance Brings Its Reward

"Bungalow" Air Compressors that were selected for the entire number of 200 Safety Cars recently purchased by the Public Service Corporation of New Jersey will serve the State's largest cities, Newark, Plainfield, Paterson, Passaic, Jersey City, Hoboken, Elizabeth and New Brunswick. This is but one of many cases where excellent performance has brought its reward to the "Bungalow." All the largest orders specify "Bungalows"—Brooklyn, 200; and Eastern Massachusetts, 250.

To date 187 electric railways throughout the country have applied "Bungalows" to 3330 Safety Cars.

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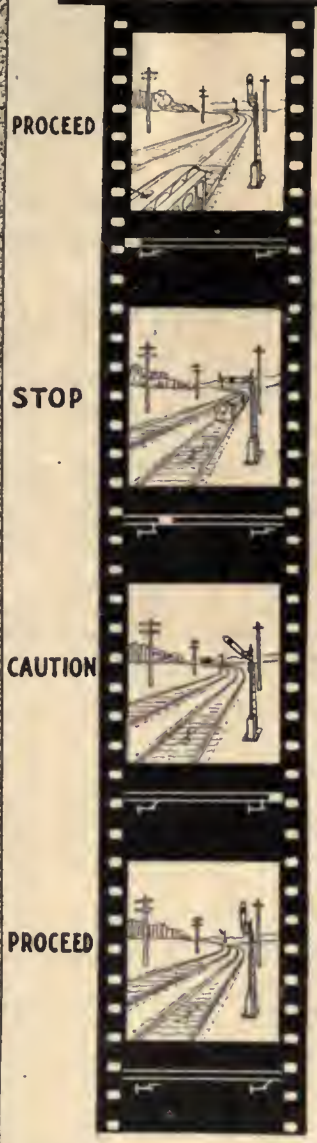
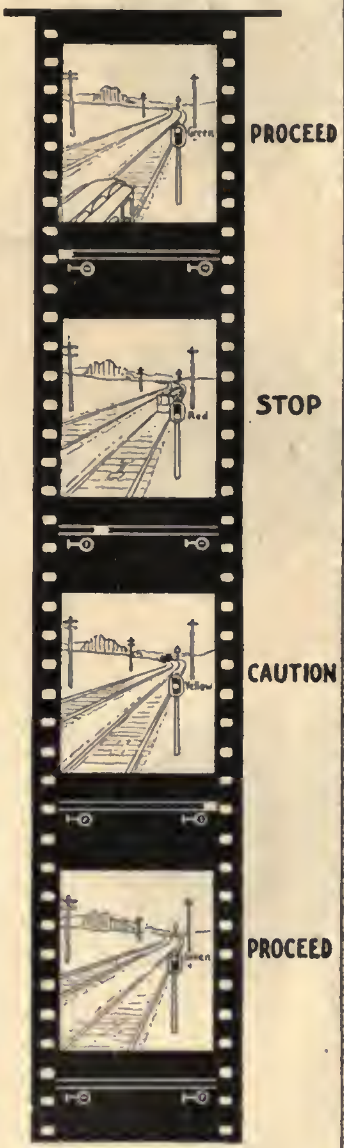


FOR DOUBLE TRACK
Interurban Railways

Union automatic ▪ block signals ▪

afford a simple system of indications easily understood by trainmen. The continuous A. C. track circuit makes possible the use of "polarized" or "wireless" control and insures the display of the proper indication at all times.

LIGHT



On the New York State Railways

On the Oakland, Antioch and Eastern

UNION EQUIPMENT WILL SOLVE YOUR INTERURBAN TRAFFIC PROBLEMS

Let us study your operating conditions and cooperate with you in considering what *automatic block signaling* will do for *your line.*

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Union Switch & Signal Co.

SWISSVALE, PA.

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Fort Worth, Texas

Richmond, Va.

Tacoma, Wash.

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Greensboro, N. C.

Tampa, Fla.

Houston, Texas

Los Angeles

An Advertisement by Users

Explaining Why It Has Becom

The beginning of a new year is the natural time to sum up past achievements as well as to look forward to new ones. What is the record with regard to the Safety Car? A record unparalleled in the history of an industry remarkable for great deeds!

Now, by all odds, the time has gone by when our word alone had to be taken for any statement about the superiority of the Safety Car.

Today our prophecies have been proved *facts* by actual results in practice with thousands of cars. *Here is what your fortunate fellow-managers who were among the first to operate Safety Cars told the 1920 Committee on One-Man Car Operation, Transportation and Traffic Association.*

Saving in Weight

Those who went the full road by using lightweight cars for operation with the Genuine Safety Devices Combination reported a saving from 25% up to more than 71%.

Saving in Power

In energy distributed at the *substation* one company reported nearly 65% saved; while in energy distributed at the car the savings in most cases exceeded 33% and in one case attained 65%. Sixteen companies averaged a total energy consumption of only 1.33 kw.-hours per car-mile.

Better Wages—Better Men

The wonderful economies and business creating power of the Safety Car made it possible for the operators to have their men share in the better earnings, the bonus ranging from 3 cents to 15 cents an hour according to circumstances.

Shorter Headways Get More Traffic

Almost all of the 55 companies reporting made big improvements in headway, one actually doubling the service. In most cases, the earnings per car-mile increased in the face of a larger number of car-miles. In fact, it was found that "Business follows service."

Make 1921 You

Safety Car Devices Company
Boatmen's Bank Bldg., St. Louis
Chicago New York Pittsburgh

Bridgeport

Bellingham, Wash.

El Paso, Texas

Cedar Rapids

# of the Genuine Safety Car

The Standard Type Everywhere

Lower Car Maintenance

One user after about a year's experience was enthusiastic enough to claim a 200% reduction. However, we are content with the 63.5% saving reported by one of the oldest operators.

Less Track Upkeep

Despite the scarcity of segregated track upkeep data, it appears that one user cut his costs 39% while another is saving at the rate of 1c per car-mile. Because of the lighter cars, safety operators can figure on lighter construction in the future—"some" consideration in these times!

Reduced Accident Expense

The "before" and "after" figures of the majority carry a bracketed "d" (DECREASE) following the Safety Car figures. Enough said after the detailed study of the Stone & Webster properties published in the ELECTRIC RAILWAY JOURNAL for Sept. 4, 1920 ("Accidents Lessened by Safety Cars," by W. H. Burke).

And They Want the Genuine Safety Devices Combination

Finally, there is the answer of the overwhelming majority that their experience led them to favor the further use of SAFETY Cars, by which they meant a car equipped with automatic laborless apparatus, so interlocked, that regardless of the illness or distraction of the operator, the power will be cut off instantaneously, the air brakes and sander apply immediately thereafter and the doors unlatch for safe and easy exit. Furthermore, it is a Safety Car only when the doors must be closed and the step folded before the car can start, and when the airbrake must be applied before the doors are opened and the step lowered in bringing the car to a service stop.

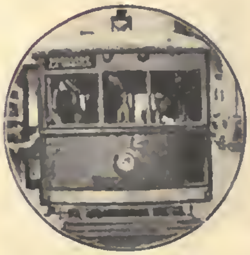
Safety Car Year!

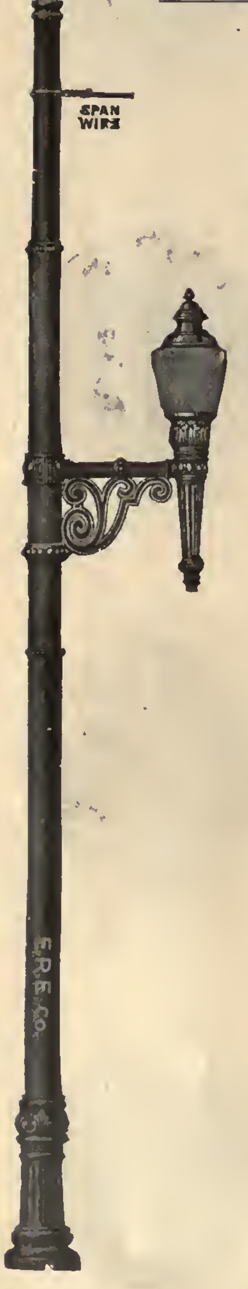
Safety Car Devices Company
Boatmen's Bank Bldg., St. Louis
Chicago New York Pittsburgh

Beaumont, Texas

Everett, Wash.

Austin, Texas


Seattle



Miami, Florida, Magic City of the South—

Proves that it is Progressive by Installing "Elreco" Combination Poles

Sells itself to its own people and to Tourists by beautifying it with Elreco Combination Poles.

First—The Merchants decided that in order to get more business the city should be made as attractive as possible.

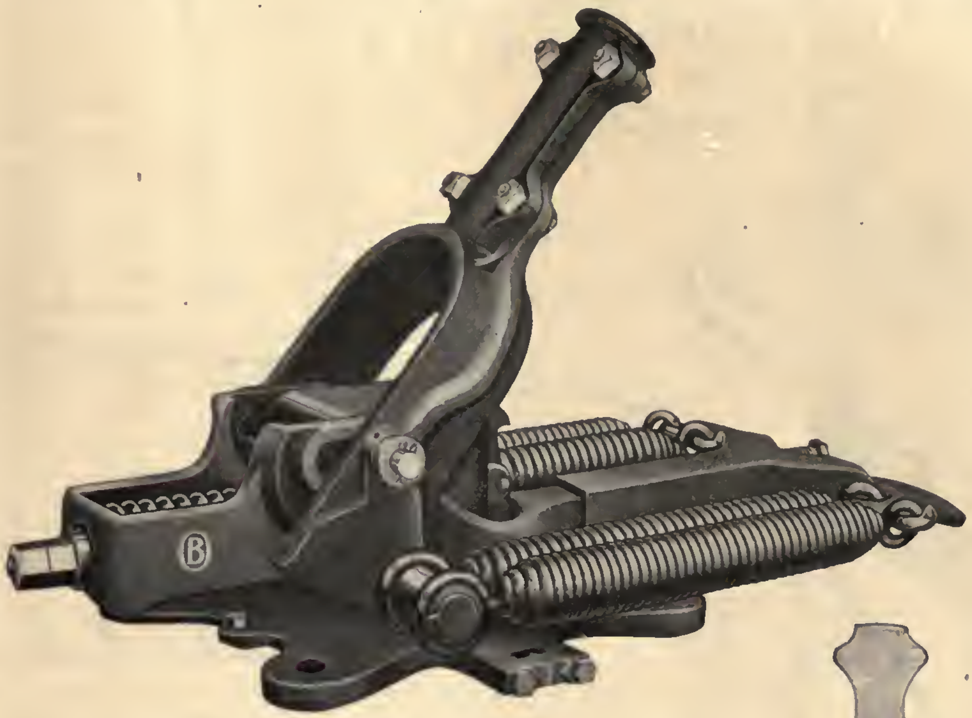
Second—That this could only be done by removing the old wooden poles and litter of wires that made the city unsightly.

Third—That Elreco Combination Poles were just what was needed to beautify the street and at the same time to be of greatest utility.

Fourth—That although there was no car line on the street at present, they were building for the future and building right.

Fifth—That what is good business for the merchant must be good business for the city, the lighting company and the railway.

Electric Railway Equipment Company
Cincinnati, Ohio
30 Church Street, New York City



O-B Base—Form 1—Patented

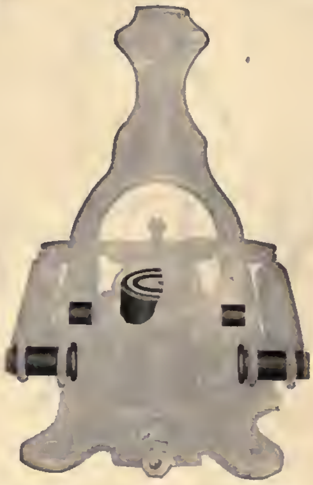
No Trained Nurse For O-B Trolley Base

Up on the roof, the O-B Base yields for low wire, leaps to the high trolley, swings around curves, cheats the sway of the high speed car. It holds to wire through thick and thin and takes its battering strains without a quiver. For there's nothing delicate and everything rugged about an O-B Base.

Week after week the miles go by and the O-B Base serves easily and without attention.

Inspection and lubrication are necessary sometimes, of course, but the simple construction makes short work of that. It is an easy matter, too, to put in new bushings which make O-B Base as good as new.

A trial on your own cars at our expense will make you as enthusiastic as we are.



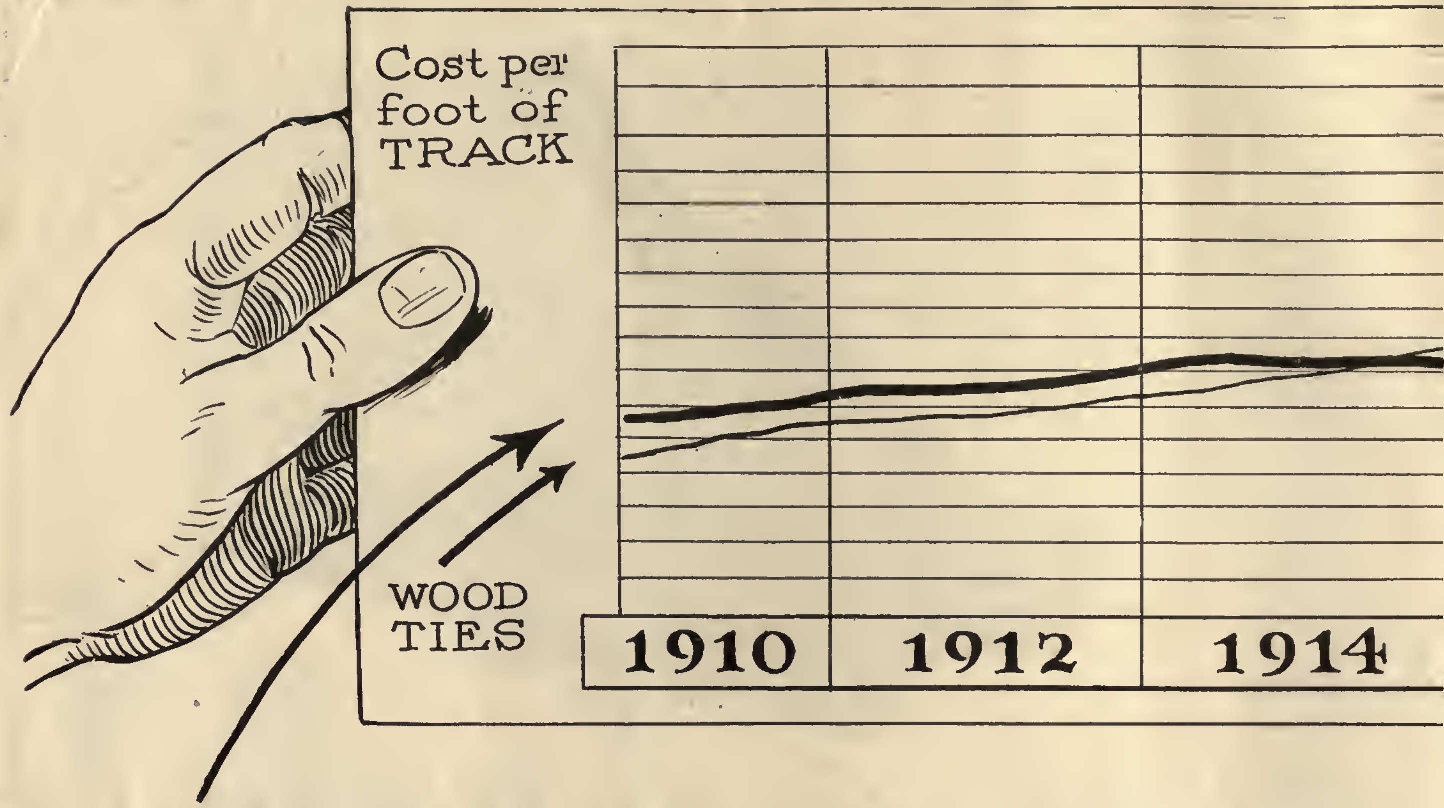
Dark parts are renewable bushings.

One man lifts base off stem. Note tho hook-down feature.

The Ohio Brass Company, Mansfield, Ohio

New York, Philadelphia, Chicago,
Pittsburgh, Los Angeles, San Francisco,
Paris, France

*Manufactures: Trolley Materials,
Rail Bonds, High Tension Insulators,
Third Rail Insulators.*



INTERNATIONAL

have steadily increased the

THE above chart shows the trend in cost-per-foot-of-track-constructed over a period embracing the last ten years.

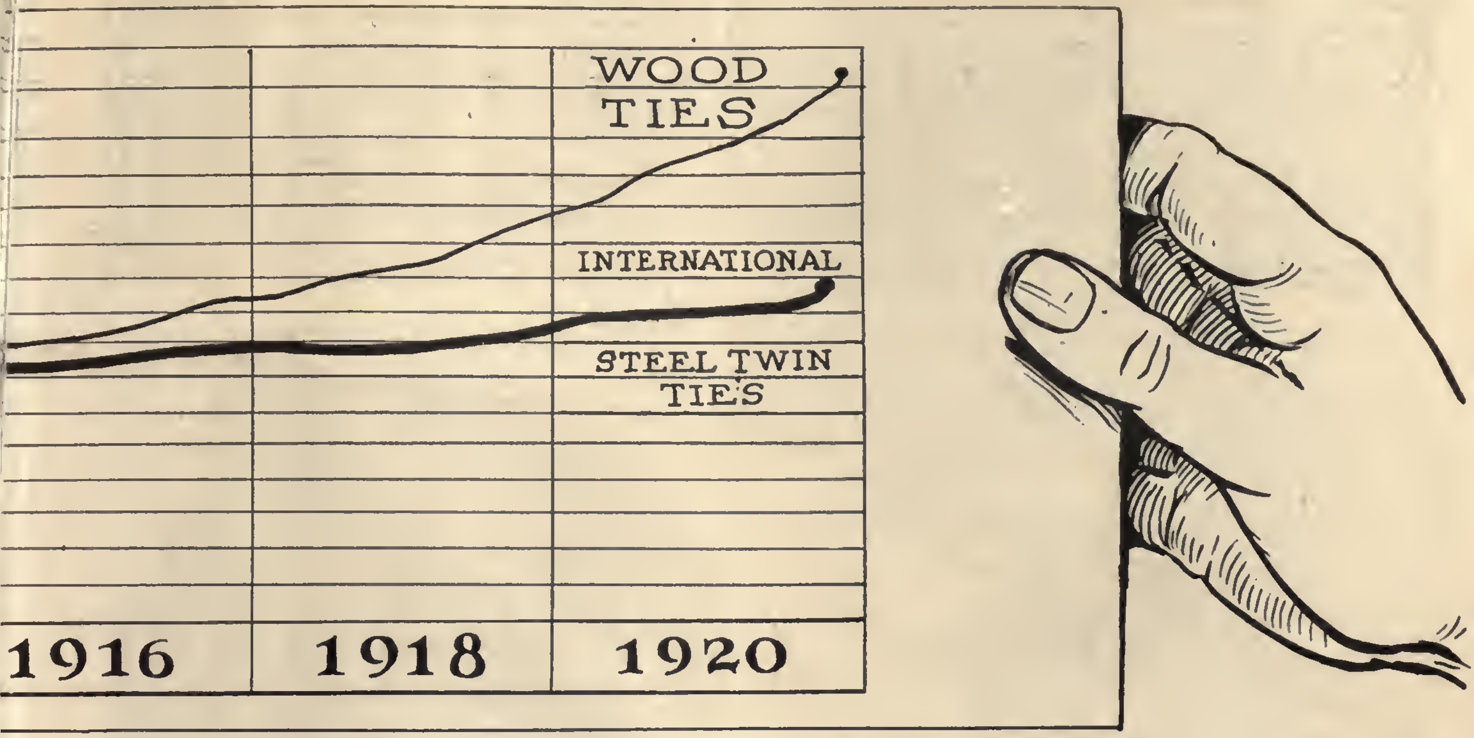
Note the rise of the Wood-tie Construction costs.

Note the conservative curve of that indicating Steel Twin Tie Track.

This is no place to go into extensive statistics—but consider a few FACTS drawn from experience.

The difference in the track trench dimensions required for wood ties and those of

The International
Manufacturers of Steel Twin
16702 Waterloo Road



STEEL TWIN TIES

saving per foot of Track

the Steel Twin Tie Track designs show an actual difference of 50 per cent. The present cost of the concrete that is eliminated by Steel Twin Ties at Fifteen Dollars a Cubic Yard Amounts to Twelve Thousand Dollars for a Mile of Single Track.

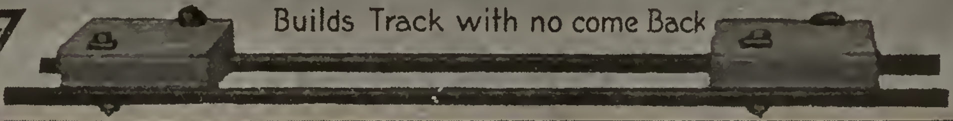
To decide whether your road can save money by building a more permanent type of construction include Steel Twin Ties in your estimates when you plan new construction.

You can have the data at hand when you need it by writing for it *today.*

Steel Tie Company
Ties and Crossing Foundations
CLEVELAND, OHIO

The RESILIENT RAILWAY TIE

Builds Track with no come Back



Reclamation vs. Reconstruction

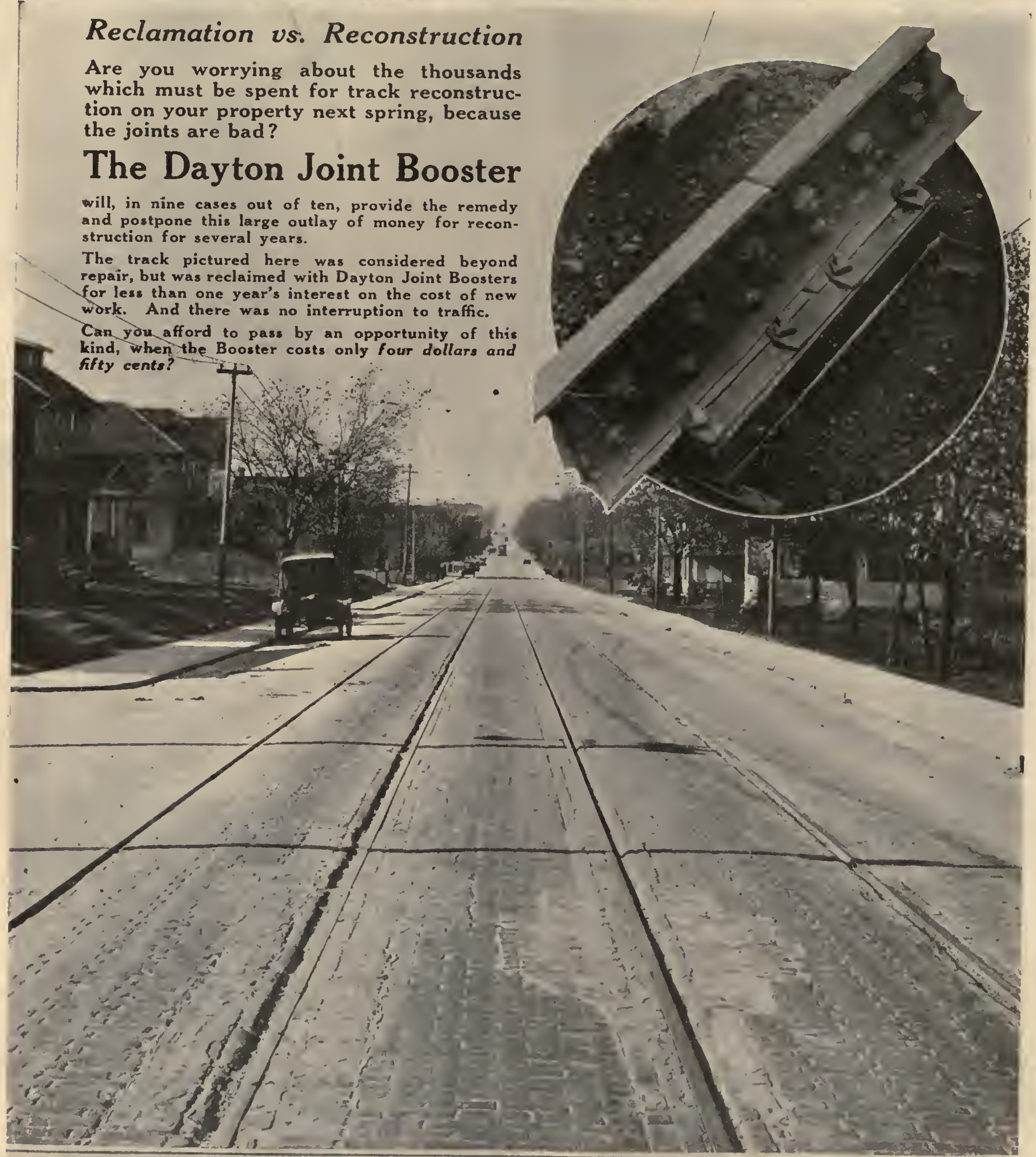
Are you worrying about the thousands which must be spent for track reconstruction on your property next spring, because the joints are bad?

The Dayton Joint Booster

will, in nine cases out of ten, provide the remedy and postpone this large outlay of money for reconstruction for several years.

The track pictured here was considered beyond repair, but was reclaimed with Dayton Joint Boosters for less than one year's interest on the cost of new work. And there was no interruption to traffic.

Can you afford to pass by an opportunity of this kind, when the Booster costs only *four dollars and fifty cents?*



THE DAYTON MECHANICAL TIE CO., 704 COMMERCIAL BUILDING, DAYTON, OHIO

When You Order Safety Cars Specify These Keystone Specialties

Signs, headlights, catchers, sanders, car signal systems, gongs and gear cases—all equipment which is of utmost importance in the building of a safety car.

The fact that these specialties used on the standard Birney Safety Car were chosen from the line of Keystone Car Specialties is a point for you to remember when buying safety cars.

Our Bulletin No. 167 shows many other specialties for use on safety cars—equipment which has been proven good and economical to buy.

Write for complete data

ELECTRIC SERVICE SUPPLIES CO.

Manufacturer of Railway Material and Electrical Supplies

PHILADELPHIA: 17th and Cambria Streets NEW YORK, 50 Church St. CHICAGO: Monadnock Building
Canadian Distributors: Lyman Tube & Supply Co., Ltd., Montreal, Toronto

Keystone-Hunter Destination Signs

Keystone Rotary Gongs

Golden Glow Headlights

Keystone Trolley Catchers

Keystone Air Sanders

Faraday Car Signal Systems

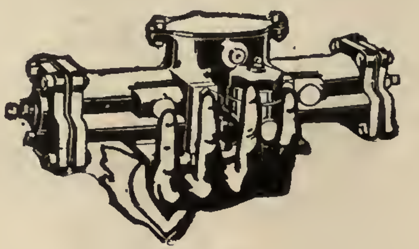
Keystone Steel Gear Cases

Standardize!

NATIONAL

Rush-hour Car Engine

Save Money



By producing more revenue miles per hour:

Partly by replacing the slow hand with almost instantaneous air;

Partly by eliminating the need for "rest period" layovers.

It's not *hours* that you want to get from your men; it's *miles.*

National Pneumatic Rush-Hour Equipment will help you to get those miles—and smiles, too!

NATIONAL

Rush-hour Engineering the Following Line for

Manual and Pneumatic Door and Step Control to make the opening and closing of doors and steps less laborious or even entirely laborless.

Door and Step Operating Mechanisms to insure the smoothest possible operation and the lowest possible upkeep of the pneumatic and other working parts.

Motorman's Signal Lights to eliminate the conductor's signal cord and the waste of time in fumbling for it while forgetting to watch the fare box.

National Pneumatic Company, Inc.
50 Church St., New York Edison Bldg., Chicago
Works: Rahway, N. J.

Manufactured in Canada by
Dominion Wheel & Foundries, Ltd., Toronto, Ont.

NPC

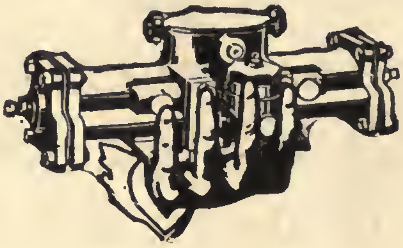
Standardize!

Pneumatize!

PNEUMATIC

ering and Equipments

Make Money



By producing more revenue miles per hour:

Whereby you get more dollars per hour;

Because car-hour revenue is the product of "miles per hour" times "earnings per mile."

Simple, trite and obvious of course; but we've made it mean just what it says.

For National Pneumatic Rush-Hour Equipment surely raises that "miles-per-hour" multiplier of "cents per car-mile."

PNEUMATIC

and Equipment Covers
Any Kind of Service

Safety Interlocking Door Control to give literally the speed of lightning in starting the car and yet make impossible the accidents of misunderstanding that occur with hand-actuated signals.

Multiple Unit Door Control to do pneumatically what multiple unit control has done electrically, namely, permit the control of *every* car in the train from *any* car in the train.

We are at your service in 1921 as in the past!

National Pneumatic Company, Inc.
50 Church St., New York Edison Bldg., Chicago
Works: Rahway, N. J.

Manufactured in Canada by
Dominion Wheel & Foundries, Ltd., Toronto, Ont.

NPC

Pneumatize!

Fish Plate Welding

The Lincoln Carbon Arc Process costs less, lasts longer, has greater conductivity and makes permanent track construction.

Track Welding

Immediately after welding the joint, the RWB Dynamotor using the metallic arc builds up cupped rails, corrugated track, special work, etc.

Bonding

It takes approximately one minute to actually weld a Lincoln bond to the rail. Now figure what your bonding crew can do.

Shop Welding

Gear cases, pinions, shafts, car wheels—in fact anything weldable is done by the same versatile dynamotor.

LACKOFKNOWLEDGEHURTS

Rail Welding and Bonding Company
formerly The Lincoln Bonding Co.
RWB
Cleveland, Ohio.

London Representative: Electrical Apparatus Export Corporation, 408-9 Bank Chambers, High Holborn
New York Office: 30 Church Street Chicago Office: 343 So. Dearborn Street

Control the Cost of Your Electrical Work

There is always a limit to what any railway can pay for labor to do its electrical work and there's also a limit as to the amount of time that it should allow for any ordinary power house or substation job to be done.

But that's the point. Some railways don't know what an ordinary cable splice costs them and that's why they have "crossed the divide" into high labor and high material costs.

Many railways know that Dossert Connectors are not only time and labor savers but that they make good wherever used because they are built right. Just the thing for cutting out a line for test purpose and it can be done in a jiffy.

Dossert Connectors are backing up the great electrification of the Chicago, Milwaukee & St. Paul—both in the plant of the Great Falls Power Company which supplies the "juice" and in the substations along the line—for making cable splices, tapping branch circuits and making bus connections.

Three-phase bus connection made with Dossert Connectors

Dossert Connectors used in bus bar compartments for making taps.

Tapping off a branch circuit by means of Dossert Connectors

How a cable splice is made with Dossert Connectors.

Photographs from plant of Great Falls (Montana) Power Co.

DOSSERT & COMPANY

242 West 41st Street
New York

GREATER PROTECTION WITH FEWER UNITS

MODERN methods of production backed up by intensive research have made possible all great advances in our age.

These factors combined with a determination to produce the best quality humanly obtainable have made it possible for users of Jeffery-Dewitt Insulators to give their lines protection with fewer units than is possible with any other type.

The installation shown is operating at 80,000 volts delta. J-D Insulators are replacing those of another type whose deterioration has forced the removal of large numbers yearly. And the replacement is being made now on the basis of four J-D Insulators for six of the original type.

Let Jeffery-Dewitt engineers look into your insulation troubles.

JEFFERY-DEWITT INSULATOR CO.

Huntington, W. Va., U. S. A.

***Pioneer Manufacturers of
Thick Cementless Disc Insulators***

New York, 30 Church St.; Boston, 176 Federal St.; Birmingham, Ala., Jefferson County Bank Bldg.;
Seattle, 526 First Ave.; St. Louis, Mo. La Salle Bldg.; St. Paul, Pioneer Bldg.; San Francisco, 183 First St.;
Los Angeles, 330 Azusa St.; Detroit, Mich., Garfield Bldg.

CHEATHAM SWITCH

SAVES SECONDS

Watch the time cars stop at switch points. A few seconds saved at each switch, by each car, totals hours of lost time. A serious matter in two man car operation; a vital question with one man cars. Speeds up schedules; improves service; increases public satisfaction. Cheatham Electric Switching Device Co., 4780 Louisville Ave., Louisville, Ky., U. S. A.

Save the waste in the Production of Power

ANACONDA

Copper—
the ideal metal for power transmission

The number of substances used for conductors of electricity in commercial work is limited to three of the useful metals—copper, iron and aluminum.

Of these the first is pre-eminently the best. Pure copper possesses many physical properties of great engineering value in addition to its high conductivity. It has to a very high degree the qualities of malleability and ductility which make it an ideal metal for wire drawing. Its strength and hardness are greater than that of *any other metal* except iron and steel.

It is not enough to save the waste in the production of power. *Conserve* this power in *transmission* by using copper wire for all overhead construction.

Conserve this Power in Transmission

TROLLEY WIRE

For the utmost in Copper Wire specify ANACONDA

Anaconda Copper Wire is made from pure electrolytic copper of average conductivity of 100.75% Mathiessens Standard.

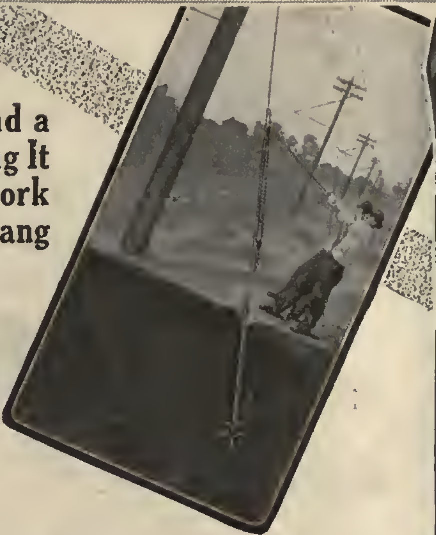
The properties which make copper the ideal metal for all transmission work, are pre-dominant in Anaconda Copper Wire.

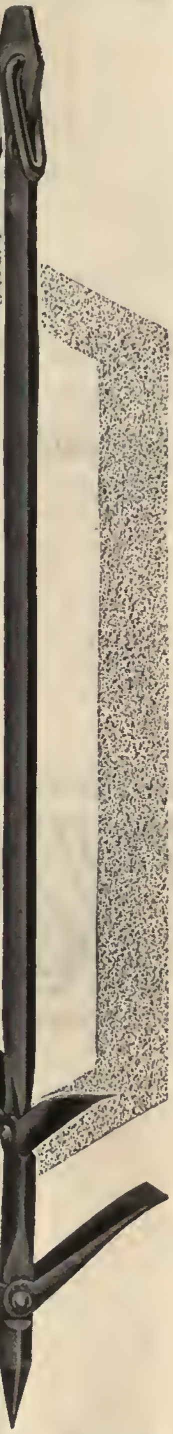
For the utmost in service, economy and satisfaction specify and use Anaconda Copper Wire—"from ore to finished product."

Anaconda Copper Mining Company
Gen. Offices, Rolling Mills Dept.:
111 *W. Washington St., Chicago*

GUY ANCHORS

A Sledge and a Man to Swing It Does the Work of a Pole Gang





Harpoon Guy Anchors
Hold Fast, Last Long and are Easily Installed

IT is no longer necessary to send out a crew of men to properly guy that pole. One or two men with a sledge and half a dozen Harpoon Guy Anchors can properly guy two poles in the same length of time it would take a crew of men to guy one by old methods.

Only a few minutes is required to set a Harpoon Anchor. It has no loose parts to be lost and requires no special tools for installing. An upward pull opens its wings 4½ feet under ground giving it a holding power of over four tons, far more than normal strain requires.

The use of carefully tested steel and hardened driving point insures a proper installation.

Let us mail you an illustrated folder of Harpoon Guy Anchors.

CROUSE-HINDS COMPANY
SYRACUSE, N. Y.
BOSTON NEW YORK CHICAGO
Condulets Panelboards
Knife Switches Floodlights
Guy Anchors
1592

CROUSE-HINDS

HABIRSHAW

"Proven by the test of time"

Insulated Wire & Cable

Fifth Avenue and 42nd Street, New York City

THIS picture shows Habirshaw cable being drawn into the underground conduits of the New York Edison Company, at New York's busiest corner. Habirshaw wires and cables may be found everywhere—in the greatest centers of population and in the most remote districts—wherever efficient and reliable service is called for.

Habirshaw Wire Manufactured by
Habirshaw Electric Cable Co.
Incorporated
Yonkers, New York

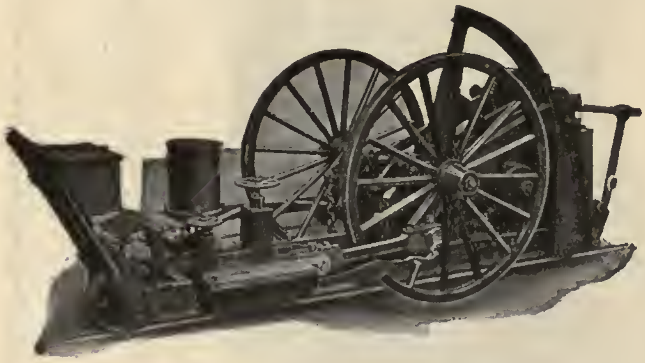
Habirshaw Wire Distributed by
Western Electric Company
Incorporated
Offices in All Principal Cities

Paper Insulated Cable
Round Conductor Cables
Sector Cables

Varnished Cambric Insulated Cables
Armored Cables

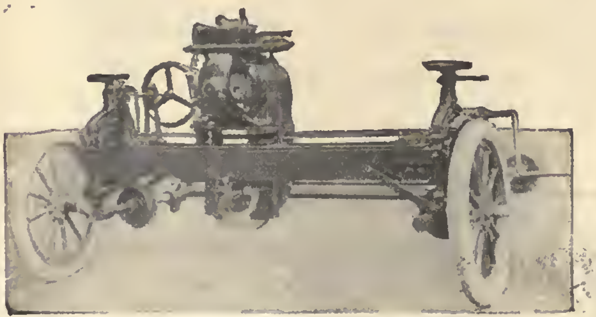
Rubber Insulated Cables
Code (Black Core)
Intermediate (Red Core)
30% Hevea R. S. A. Standard

In Philadelphia



Reciprocating Track Grinder

Atlas Rail Grinder



Universal Rotary Track Grinder

How They Do Come!

ORDERS from South America, England, Belgium, Switzerland and Canada are being received regularly.

Repeat orders from the large railways in the United States are the rule, a glance at the illustration above being conclusive evidence of how the better railways are specifying this equipment.

Tell us your track troubles and we can tell you how much you can save.

RAILWAY TRACK-WORK COMPANY
3132-48 E. Thompson St.
Philadelphia, Pa.

Exclusive Agents:
ATLAS RAILWAY SUPPLY CO.,
Chicago, Ill.

ELECTRICAL ENGINEERING & MANUFACTURING CO.,
Pittsburgh, Pa.

Exclusive Agents:
CHAS. N. WOOD CO.,
Boston, Mass.

HITCHCOCK, LLOYD & CO., Inc.,
77A Queen Victoria St., E. C.
London, England.

Let's consider 'em together

U. S. ELECTRIC SIGNALS—

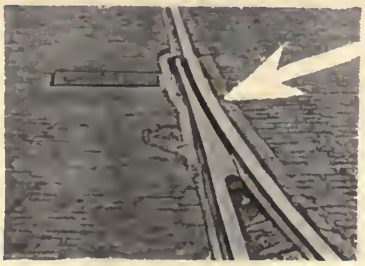
Collins Automatic Switches

To please your public by eliminating the hand signal setting and hand switch throwing now responsible for unnecessary opening of front doors, needless danger to passengers, annoying delays and unsatisfactory schedule speeds.

To please your platform operators—especially on safety cars—by eliminating the inevitable irritation and loss of time caused by their leaving the cars at every branch-off or every siding.

To please yourself by securing the economies and the increases in traffic that come from faster schedules with greater safety, contented transportation salesmen and satisfied riders.

Let's help you analyze your needs for one or both of these devices according to whether you are operating city or country service—or both.



United States Electric Signal Company

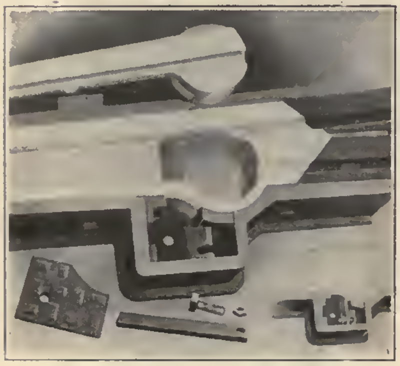
West Newton, Mass.

Our extensive, modern plant, illustrated on this page, is equipped to fabricate track work of all constructions, Solid Manganese Steel, Manganese Steel Insert, Plain Bolted and Manganese Steel "T" Rail, etc., which coupled with our long experience, places us in a position to supply your needs efficiently.

WHARTON SPECIAL

SWITCHES—MATES—

of Solid Manganese Steel



"GIANT HEEL" Switch

Converter and Electric Steel Castings

WM. WHARTON JR. & CO., INC.

EASTON, PENNA.

"Originators of Manganese Steel Track Work"

SALES OFFICES:

Denver, Colo.
New York City
Boston, Mass.
Chicago, Ill.
Philadelphia, Pa.
Pittsburgh, Pa.
San Francisco, Cal.
Scranton, Pa.

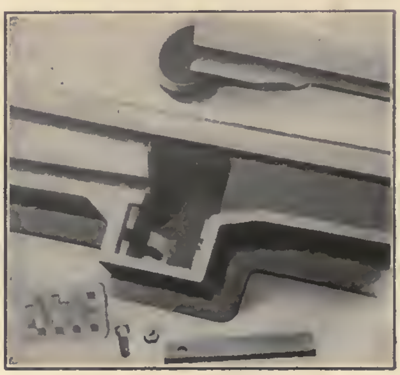
The illustration above gives a comprehensive view of our large Layout Yard, where Special Track Work is assembled and carefully fitted together, to avoid any possibility of trouble during installation. No piece of work leaves our plant without such careful fitting.

TRACK WORK

FROGS—CROSSINGS

and Manganese Steel Insert

Hammer and Press Forgings
Seamless Steel Gas Cylinders



H. C. B. Switch

Subsidiary of **Taylor-Wharton Iron & Steel Co.**
High Bridge, N. J.

Other Plants:
TAYLOR-WHARTON IRON & STEEL CO., High Bridge, N. J.
PHILADELPHIA ROLL & MACHINE CO., Philadelphia
TIOGA STEEL & IRON CO., Philadelphia

Arc Weld Rail Bonds

The value of Arc Weld Rail Bonds depends on the brazed union between the iron terminal and the copper conductor.

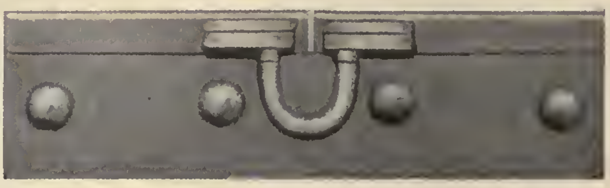
As sole manufacturer of Electrically Brazed Rail Bonds we have had 17 years of experience with such unions.

That is why all our Arc Weld Bonds have an open face.

You can always look into it, inspect it, and convince yourself that it is the most dependable design.

They are applied with the ERICO hundred-pound welding outfit or with any other portable arc welding equipment.

Write for further information.



The Electric Railway Improvement Co.
Cleveland, O.

BUDA
ESTABLISHED
1881

"Buda" Insures Highest Quality Throughout

TRACK WORK for every condition of service, in standard layouts, or complicated special work, can be relied upon for unusual performance if it was made in the Buda shops. Long life with low maintenance costs is built into every piece of equipment marked with the Buda name and serviceable performance has built the Buda reputation.

Our engineering department is at your service with their specialized experience, for the solution of any track work problems.

Literature covering every phase of track construction and maintenance will be sent upon request.

THE BUDA COMPANY
HARVEY - CHICAGO SUBURB - ILLINOIS

Write It—1921

beginning today

"HAPPY NEW YEAR"

What does it mean to **Electric Railways** for this year?

What will it mean to your **Road** this year? Whatever happens, **You Are "Among Friends."** 1921 ushers in the **Tenth (10)** year of one of your **Veribest Friends,** always at your **Service**—Truly a Friend in time of Need.

Think back since 1912, (the time **Your Friend** was born) what would you have done without this **Friend,** during the **Depression** of 1914—Later, the **Jitney Pest** period—Then the **War-r-r** period, then the **Unrest** and **At Rest** in 1920.

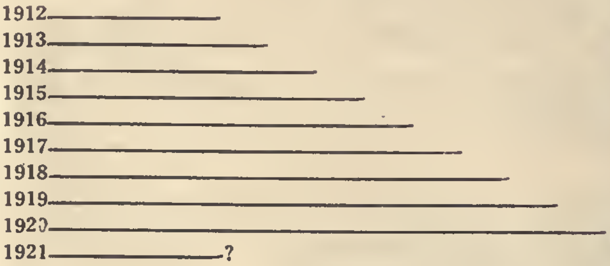
Many, many Roads owe their **Existence** and Ability to keep Going (to say nothing of the **Millions** of Dollars **Saved** Annually) to the Good Friend **"The Greatest Aid to the Way Engineer."**

In 1912 the **Metal Electrode Arc-Welding** Process was first commercialized for Street Railway Track **Maintenance** and **Construction.**

The **Indianapolis Method**—The **Resistance** method has the **Punch,** *welds* (not melts) Welds by **First Intention**—Instantaneous—**Deep**—and **Strong.**

It has proven Against **Theory** and through **Practice—Still the Most Efficient—Economical** and **Practical** for **Track Work,** for "Building up" on the surface and Applying Welded Joint and Bonding Plates.

Merit and **Merit Alone** is responsible for the **Continued** and **Increasing** use by Street Railways—as shown by the comparative chart below.



"Apex" Joint for Guard and Girder Rail

Now a fully established, indispensible—**Universally.** A necessity for maximum economy in Operation.

More Roads using the **Indianapolis** Method, than all other Methods **Combined. More Indianapolis Fluxated Welding Steel** (Electrodes) used than all other brands of welding wire combined for track purposes.

More Street Railways using **Indianapolis Welded Joint and Bonding Plates,** than are using all other types of welded joints combined.

To stop maintenance charges—**Reclaim** the Old Track—with the **Indianapolis. To Insure Against Maintenance—Construct** New Track—With the **Indianapolis.**

The more you use—the more you save. Write us today—Jan. 1, 1921.
Make this your ***Thriftiest*** *year—Start* ***Today.***

INDIANAPOLIS SWITCH & FROG CO.

SPRINGFIELD, OHIO

—*backed by Chicago Pneumatic Service*

EVERY user of electric drills knows this to be a fact—

Even a mechanically correct electric drill, to *maintain* its efficiency, must be backed by a *practical, personal-touch* service.

The practical service rendered users of Little Giant Electric Drills is, in addition to correct design, a direct result of a nation-wide chain of Service Stations.

These Service Branches insure prompt delivery of new tools and spare parts. Connecting up the user with this service are seasoned Service Engineers. This means better drill performance—the *right* drill on the job *all* the time.

Little Giant Portable Electric Drills are made in a complete line in A.C., D.C., and Universal types. Capacities $\frac{3}{16}$" to 1$\frac{3}{4}$" drilling in metal.

Ask for Booklet 397.

Chicago Pneumatic Tool Company
Chicago Pneumatic Building · 6 East 44th Street · New York

Sales and Service Branches all over the World

BIRMINGHAM
BOSTON
BUFFALO
CINCINNATI
CLEVELAND
DETROIT
ELDORADO
EL PASO
ERIE
JOPLIN
LOS ANGELES
MILWAUKEE
MINNEAPOLIS
NEW YORK
PHILADELPHIA
PITTSBURGH
PORTLAND
RICHMOND
SALT LAKE CITY
SAN FRANCISCO
SEATTLE
ST LOUIS
TUCSON
BOMBAY
BRUSSELS
FRASERBURGH
HAVANA
HONOLULU
JOHANNESBURG
CHRISTIANIA
LONDON
MILAN
MONTREAL
OSAKA
PARIS
SEOUL
SYDNEY
TOKYO
TORONTO
VANCOUVER
WINNIPEG

EI-23

BOYER PNEUMATIC HAMMERS - - LITTLE GIANT PNEUMATIC AND ELECTRIC TOOLS
CHICAGO PNEUMATIC AIR COMPRESSORS - - VACUUM PUMPS - GIANT FUEL-OIL, GAS,
GASOLINE AND STEAM ENGINES ROCK DRILLS - - COAL DRILLS

LITTLE *Electric* **GIANT** *Tools*

ECONOMY METERS

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KILOWATT HOURS
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A
ECONOMY ELECTRIC RAILWAY METER
SANGAMO ELECTRIC COMPANY
SPRINGFIELD, ILLINOIS.
NO. 1036948 VOLTS 550 AMPS. 100
3 31/3 WATTHOURS PER DISK REVOLUTION
MFD. EXCLUSIVELY FOR
ECONOMY ELECTRIC DEVICES CO.
CHICAGO

Car Inspection Dials on Power-Saving Railway Meter

FOR CINCINNATI

WILL EQUIP ALL ACTIVE CARS

To Save Power at the Car—
—To Save Labor at the Car House

THIS is another one of the long list of notable electric railways to adopt the Economy Meter, now Standard on 60 Railways.

Economy Meters are rugged time-tried devices.

Any "Power Saving Devices" will induce energy savings but only the Economy Meter will get the maximum saving with no hazard to passengers or equipment. The Economy Meter gives the only actual check on how much energy is consumed per man or car. The records from Economy Meters actually show a motorman whether he has saved power—and how much. No other devices do this.

There is no mystery about Power Saving with Economy Meters.

The ECONOMY "Power-saving" and Car Inspection Meter provides a method that accurately and automatically shows when inspection is needed. It also shows at a glance how much more work a car can do before inspection is needed, or, in case of a road failure, how much work the car has done previous to the failure. All this is had without any clerical labor.

The records from Economy Meters are of high value for managerial and engineering purposes.

Economy Power-Saving Meters tell you— without trouble

1. WHO are your careful, economical motormen.
2. WHICH motormen need instruction in proper handling of car equipment.
3. HOW much power is being saved by motormen collectively, and individually, by direct reading units of power.
4. HOW much power is being used on any section of your lines.
5. HOW much power is being used in trailer service.
6. HOW much power your freight and express service is using.
7. HOW much power is being used for switching and car movements in yards.
8. WHAT is the line loss on your D.C. distribution.
9. WHEN your schedule speeds are too high or too low.
10. WHAT is the most economical equipment for any service.
11. WHAT are the proper gear ratios for given service conditions.
12. WHEN each car should be inspected.

Ask for Deferred Payment Plan and estimate of operating costs.

Meter the energy - that's what you want to save

Economy Electric Devices Company

L. E. GOULD, Pres.
Old Colony Bldg., Chicago
Cable Address: Sangamo, Chicago

National Railway Appliance Co., New York
L. A. Nott, San Francisco

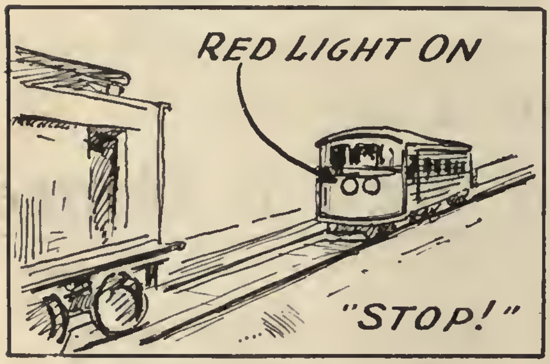
Burton R. Stare Co., Seattle
J. G. Monahan, Los Angeles

Ludwig Hommel & Co., Pittsburgh
Grayson Railway Supply Co., St. Louis

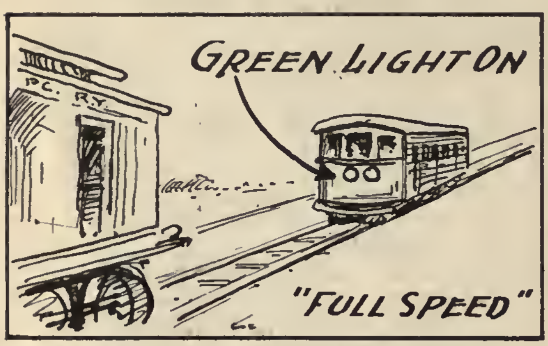
Making Safety Car

N-L

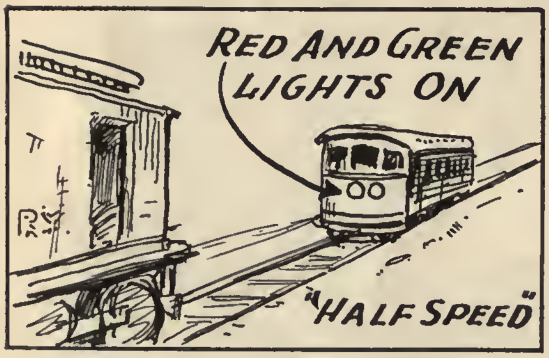
Indicating Signals



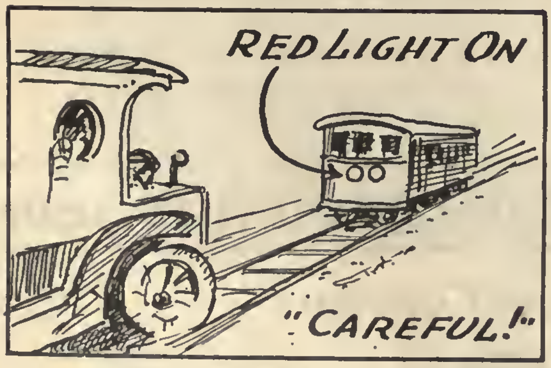
"Power off! Throw off controller—COAST—be ready to STOP."



"Full speed ahead! Speed up—faster schedules—all SAFE!"


RED AND GREEN LIGHTS ON
"HALF SPEED"

"Half speed — slow schedule — difficult traffic ahead—take care!"



"Drive slowly—I'm coasting and may stop at any moment—look out for skidding—passengers going to alight."

for smooth operation, power economy, personal safety and the *practical elimination of rear-end collisions,* N-L INDICATING SIGNALS are essential equipment for the Safety Car. The motormen and the driving public in the cities where they are used both unite in this opinion. They *know,* from actual experience.

Briefly, N-L Indicating Signals show to the motorman of the following car, as well as to the driving public, the *exact operations* of the car ahead.

The small diagrams to the left show the "high spots" of N-L operation—they do not show how fully these INDICATING SIGNALS make for safe operation under every condition of traffic.

By taking the strain of *watching the speed of the car ahead* from the motorman they release his attention for safer car operation, maximum coasting and faster schedules. They reduce the number of false moves of brakes and the wear and tear on motors, brakes and trucks.

On the *one-man* car it is imperative that everything be done to enable that one man to concentrate. JUST ASK THE MOTORMEN on cars using N-L Indicating Signals. They are enthusiastic. Write us and we will be glad to send list of roads N-L equipped, together with opinions of executives who are convinced that N-L Indicating Signals are ESSENTIAL EQUIPMENT.

The

8404
Lorain Ave.,

Operation Safer

N-L

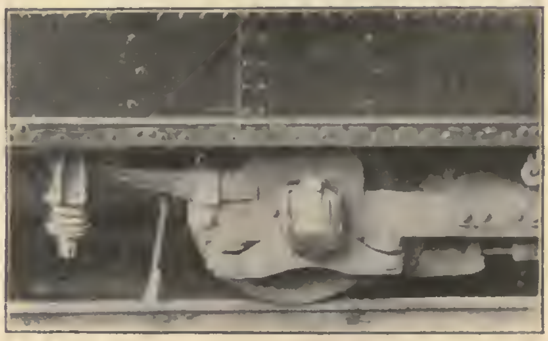
Mechanical Sanders

The two obvious considerations of the use of sanders as applied to safety car operation are 1—Safety and 2—Economy in the use of sand.

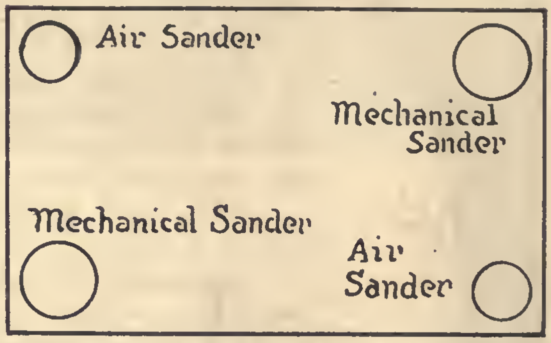
Suppose you are operating a Safety Car and the AIR is suddenly lost, just when you need it to apply sand to the rails. If you are equipped with N-L Mechanical Sanders the motorman can apply sand with a slight, continuous pressure of his foot, at the same instant he applies the hand brake. Such a condition (loss of air) can easily happen—does frequently happen—but no accident need result from failure to sand the rails when you have the N-L Mechanical Sander.

As to ECONOMY—when these mechanical sanders are used there is no danger of the motormen misapplying their control apparatus, starting the emergency flow of sand and literally flooding the track with it. N-L Mechanical Sanders will supply all the sand you need and no more and your cars will not come back empty to need complete refilling at night.

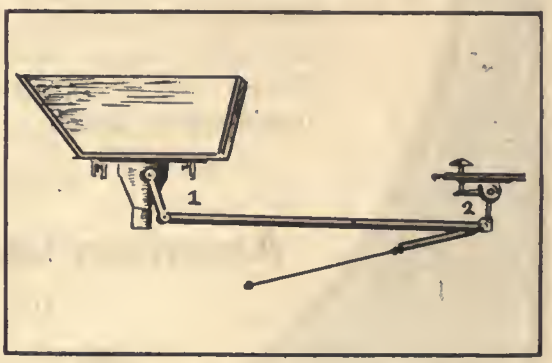
But the big point is that loss of air is apt to happen to ANY car. No car should be so equipped that sand cannot be instantly applied under that condition. If a hand-brake appeals to you as an additional safety adjunct so should N-L Mechanical Sanders. Full details and literature on request.



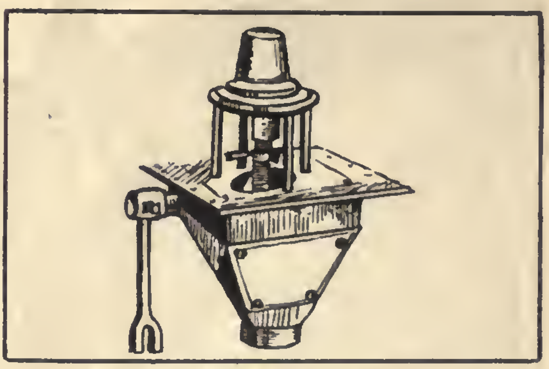
Typical installation showing a car that uses 30% as much sand as when not equipped with N-L Mechanical Sanders.



This is the way we recommend these Sanders be used—giving a properly balanced Sander Equipment.



Here is all there is to it for the Safety Car—rapidly and cheaply installed.



N-L Mechanical Sand Valve. Patented. A slight pressure operates it and motormen say operation is a "cinch."

Nichols-Lintern Co.

Cleveland, Ohio

BERWICK ELECTRIC RIVET HEATER

Saving $500 Daily

In One Plant.

That's what Berwick Electric Heaters are doing for us. Other manufacturers are profiting proportionately, the Heater illustrated being one of 472 now in use in other than our own plants, where we are using 250.

Likewise in *your* shops the Berwick would (1) reduce the cost of heating rivets, (2) practically eliminate burning and scaling losses, (3) reduce throwing of rivets to a minimum, (4) make possible a three-unit gang in many instances, (5) save time by providing heated rivets in a few seconds whenever needed, (6) eliminate smoke, fumes, and excessive heat, (7) improve your riveting by insuring properly heated rivets with hot cores (which means a saving of 10 to 20 per cent hammer blows), and (8) operate safely and continuously at negligible maintenance cost.

Worth investigating, isn't it?

American Car and Foundry Company

165 Broadway, New York

Chicago St. Louis

Detroit Avenue, Cleveland, Ohio

GRANITE PAVING BLOCK

They give the recognized best, most modern, most acceptable, most economical, most enduring, street pavement.

The only kind of paving material developed to date that lasts indefinitely.

Have been standard with the The Cleveland Railway Company for the past eight years on all new track work.

GRANITE EVERLASTING

THE NORTHERN GRANITE & STONE COMPANY
909 LEADER-NEWS BUILDING, CLEVELAND, OHIO
Prompt shipping facilities by rail or water.

TONCAN METAL CORRUGATED CULVERTS

Usually you can tell the make of an automobile at a glance—but not so with corrugated culverts. Except for workmanship they all look alike. But, if a corrugated culvert bears the trade mark as shown below, then you can be sure it is made of the genuine rust resisting Toncan Metal—the metal known everywhere for its wonderful enduring qualities.

SPC.
TONCAN
METAL

Send for the name of the nearest manufacturer making corrugated culverts of Toncan Metal. Toncan Metal is also made into Roofing, Siding, Ventilators, Eaves Trough, Conductor Pipe and other sheet metal products.

Toncan Metal is made only by

THE STARK ROLLING MILL CO., CANTON, OHIO

TRACK CLEAR
PROCEED

CAR AHEAD
Going in Same Direction.
Proceed with Caution

STOP

Chapman Automatic Signals

Made to Sell Safe and Satisfactory Service

The hand-throw signal with its possible danger of men failing to leave the car to throw it, and the invariable loss of time and annoyance to passengers when they did get off to do so, "got by" in the days when the electric way was the only way.

Today the public has been educated to insist upon better speed and shorter headways—but the public demands enhanced safety, too.

Years before this feeling became general the Chapman Automatic Signal had already proved that it could meet these demands to the full.

In fact, the Chapman Signal meets every requirement raised over the whole scale of operation from short-headway service in one-man car communities to high-speed trains, such as those of the famous "Chautauqua Route."

The Chapman is also the only automatic contact signal whose indications are made clear by an unmistakable background. It is also the only signal which attracts the attention of and therefore advertises the safety of your service to the passenger. The disk and semaphore arm showing the clearance conditions along the line are original and individual to the Chapman System.

A "Chapman" used to mean a salesman of goods. Today's "Chapman" will help you to sell *transportation.*

The signal with the unmistakable background in any kind of weather.

Charles N. Wood Company
14 Federal Street, Boston, Mass.

For Turbine Lubrication

Good Oil is a Most Important Factor

A constant stream of clean, cooling oil must be supplied to the bearings at all times. ¶The oil must not emulsify nor form deposit of any kind and must free itself from any moisture entering the system. ¶It must also maintain a uniform quality over long periods of time.

TEXACO REGAL OIL

A special product for a special purpose which meets perfectly turbine conditions

TEXACO REGAL OIL is only one of the many Texaco Lubricants made for special purposes.

There is a Texaco Lubricant for every mechanical appliance in the shop as well as in the power plant.

Consultation with Texaco Lubrication Engineers regarding any or all of your lubricating requirements is invited.

And don't forget to ask us about Texaco Crater Compound, the Great Gear Lubricant and our Texaco Car Oils.

The Texas Company

Dept. RJ, 17 Battery Pl., N. Y. C.
New York Chicago Houston
Offices in Principal Cities

TULC-
a name that
signifies the
utmost in
scientific
lubrication

TULC
A
LUBRICANT

TULC is a lubricant scientifically compounded to reduce lubricating costs. But the word "Tulc" means more than that. It is a name that signifies the utmost in scientific lubrication, through the application of individual and concentrated *lubrication service.*

Wherever Tulc is in use you may know that it is accompanied by the service of personal responsibility. Roads which have availed themselves of the service have cut their lubricating costs as high as 40%.

Our Engineering Department is at your disposal.
Write today and ask us to submit proof.

The Universal Lubricating Co.

Offices: Schofield Bldg. **Works: Sweeney Ave.**
CLEVELAND, OHIO

TULC
A
LUBRICANT

—scientifically and
accurately compounded to
reduce lubricating costs

IRVINGTON
VARNISHED CAMBRIC

is woven from specially selected long fibre cotton.

The fabric is treated in our own bleachery by a special process which gives it a smooth uniform finish, increases its insulation value and mechanical strength.

Uniform coatings of any desired thickness are obtained by treatment in our own specially designed towers.

Irvington Insulation in silk, cotton or paper in punched form, washers, tubing or odd shapes can be supplied to meet your requirements.

Our increased facilities enable us to make prompt shipments of orders.

Samples and data on request.

Six Factors of Quality

High Dielectric Strength
Added protection for the same construction.

High Resistance
Leakage reduced to minimum.

Flexibility
The flexible nature of the material increases speed and efficiency of production without reduction of standards.

Non-Hygroscopic
Leakage attendant upon atmospheric changes eliminated.

Heat Resisting
Not affected by working temperatures.

Chemically Neutral
Does not affect and is not affected by impregnating compounds or varnishes.

IRVINGTON PRODUCTS

Oiled Silk, Varnished Paper, Black and Yellow Varnished Cambric, Flexible Varnished Tubing, Special Folded Paper for Coil Windings, Insulating Varnishes.

TRADE MARK
Reg. U. S. Pat. Off.

IRVINGTON VARNISH & INSULATOR CO.
Irvington, New Jersey.
Established 1905

BLACK
VARNISHED CAMBRIC

Most of the insulation material in cable and electrical machine manufacture is BLACK varnished cambric.

It provides higher insulation and is lower in cost.

Repairs to such equipment should be made with BLACK varnished cambric.

Are *you* using it?

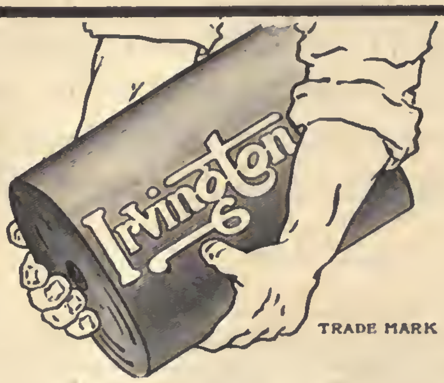
We make both yellow and black but by far the greater demand is for BLACK.

Samples of both will be gladly sent for you to test.

Distributers:

MITCHELL-RAND MFG. CO., New York City
L. L. FLEIG & CO., Chicago
ELECTRIC RAILWAY & MANUFACTURERS SUPPLY CO., San Francisco
CONSUMERS RUBBER CO., Cleveland
T. C. WHITE ELECTRICAL SUPPLY CO., St. Louis, Mo.

Largest makers of Varnished Cambric in the world



IRVINGTON VARNISH & INSULATOR Co.
Irvington, New Jersey.

Established 1905

Conductor's assistants who work for $2.00 a year

Look at Johnson Fare Boxes as supplementary platform help—as assistants to your conductors. Here is part of the work they perform. They help your conductors keep an accurate check on all fares and reduce free rides to a minimum. They enable him to speed up schedules by decreasing the duration of stops—a feature which results in better service. They give him more time to look after the comfort and safety of passengers, thereby fostering public good will. Their all 'round efficiency actually increases gross revenue 3 to 10%.

A mighty efficient helper that will accomplish these things day in day out, year in year out, with never a day off and never a complaint about working conditions or wages. And yet the salary of this "helper" is but $2.00 a year. That's the average yearly maintenance cost of one Johnson Fare Box.

Can you afford not to put this dividend producer to work on your cars? Remember, Johnson Fare Boxes virtually cost you nothing. You merely advance the price against the cash returns which begin the hour you place the boxes in operation. Write today and permit our Engineering Department to send you *all* the facts.

JOHNSON FARE BOX COMPANY

Ravenswood, Chicago, Ill.

Operation and Co-operation

Managers in charge of operation of Street Railways realize that lack of courtesy, lack of skill in handling the public, and lack of co-operation generally on the part of employees, entail grave losses on their properties.

These losses result from the indifference and wrong mental attitude which are in evidence in many industrial directions.

Are you waiting for this condition on your property to correct itself? Or are you attempting to deal with it by applying pre-war methods? Or are you solving this serious problem in a sound, constructive way by availing yourself of the standard remedy which has been tried and tested by hundreds of industries and properties?

Our success in this field has built for us the largest business of its kind in World, requiring Thirteen Offices and an Organization of over One Thousand specialist-members to serve our clientele which embraces all basic industries, and comprises employers with as low as Fifty workers up to those with 100,000 or more workers.

If you are an Official in charge of operation you should look into the merits of our constructive service without delay. Our nearest office will gladly send a representative to explain how your results can be increased.

There is no obligation.

SHERMAN SERVICE INC.

Production Engineering Industrial Co-ordination

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Toronto
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Largest organization of its kind in the world.

SHERMAN SERVICE

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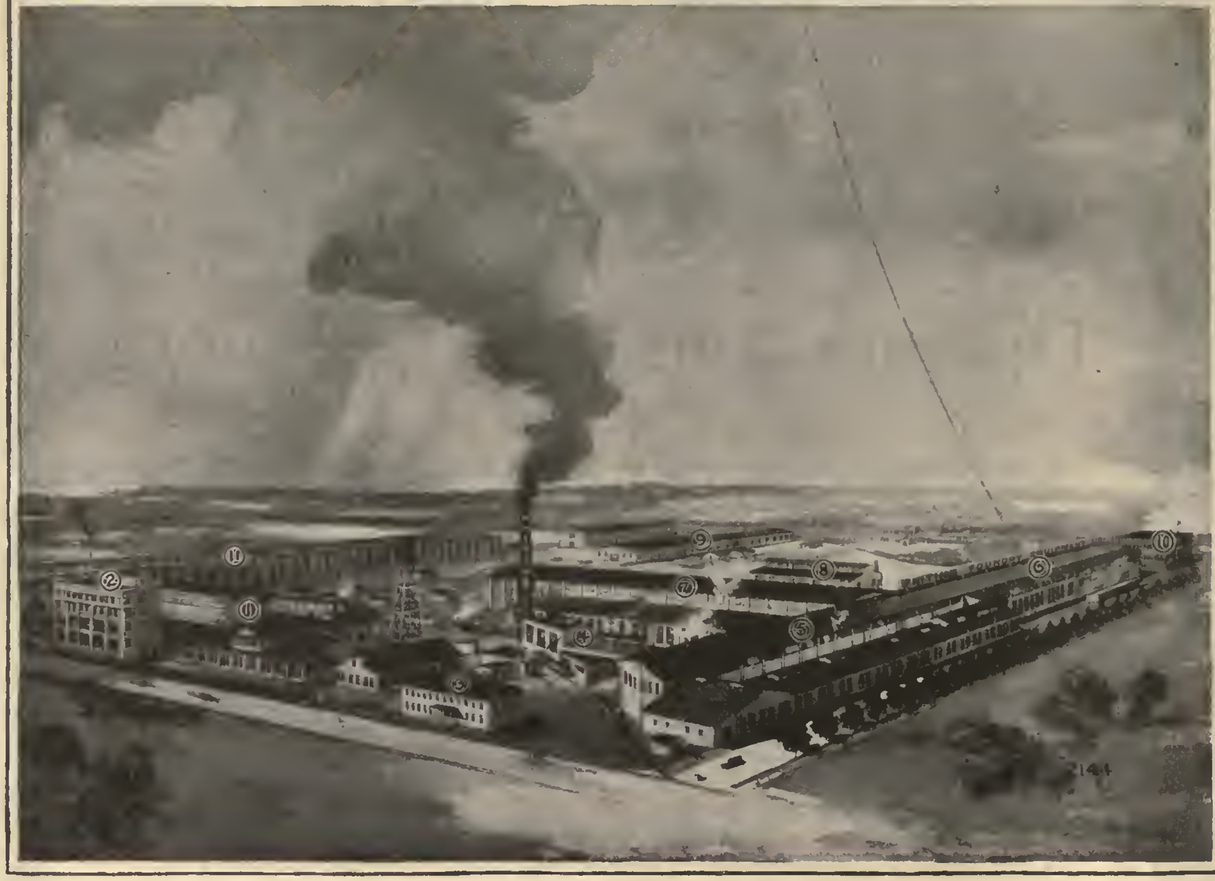


Enlarged Manufacturing Facilities

plus our many years experience will enable us to make 1921 a year of bigger and better Whiting Service.

The floor area of our plant now totals approximately 286,000 sq. ft., and represents an increase of about 25% during the last three years.

We desire at this time to thank our many friends whose patronage has so materially aided our growth and development in the crane and foundry equipment industries, and extend to all our best wishes for the New Year.

In the above view departments are indicated by numbers as follows:

1. Grey Iron, Steel and Brass Foundry.
2. Pattern Shop.
3. Restaurant.
4. Power House.
5. Machine Shop.
6. Assembly Shop.
7. Structural Shop.
8. Forge Shop.
9. Storage.
10. Main Office.
11. Yard Crane.

WHITING CORPORATION
(Formerly Whiting Foundry Equipment Co.)
Main Office and Works, Harvey, Illinois
Representatives in 25 Principal Cities

WHITING

CRANES
FOUNDRY EQUIPMENT
RAILWAY SPECIALTIES

ACKLEY BRAKES
Found The World Over

True Economy

Figure the total cost of the usual staff brake with vertical hand wheel—and you will understand why the

ACKLEY NO-STAFF

represents real economy in first cost, and installation and operating expense.

The No-Staff, through its direct drive, eliminates your present staff with its bevel-gear friction which prevents prompt release. It comprises in one compact assembly, the ideal smooth-acting hand brake. It pays for itself in the increased speed allowable.

The man who uses it, swears by it.

Specify for new and rebuilt equipment

Ackley No-Staff—Bulletin D
Ackley 2-E (Staff)—Bulletin E

REPRESENTATIVES:

E. A. Thornwell, Atlanta Trust Company Bldg., Atlanta, Ga.
Walter H. Evans, McCormick Building, Chicago, Ill.
A. W. Arlin, Pacific Electric Building, Los Angeles, Calif.
Power Equipment Company, Oliver Bldg., Pittsburgh, Pa.

ACKLEY NO-STAFF TRADE BRAKE MARK

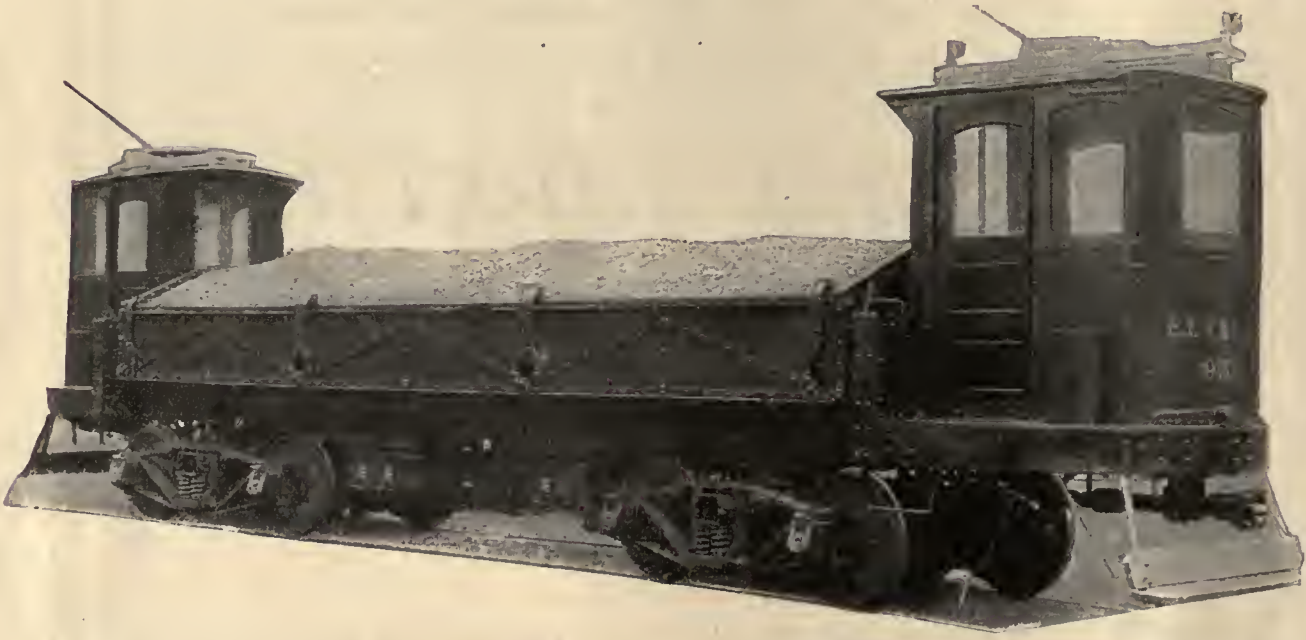
ACKLEY BRAKE & SUPPLY CORPORATION
G.S. ACKLEY & COMPANY. REPRESENTATIVES
50 Church Street, New York, U.S.A.
Agencies throughout the World
Cable address "Acklebrake"

ACKLEY 2-E BRAKE

YOUR BUDGET

should include

DIFFERENTIAL CARS



Let the new year be one of economy.

That Differential Cars produce this result is a matter of recorded performance. Get their economy record from their users.

THE DIFFERENTIAL STEEL CAR CO.
H. Fort Flowers, Pres. & Gen. Mgr.
Findlay, Ohio

The World's best Lubricants

IS it not a fair and logical conclusion that the lubricant which delivers the most mileage, that bears the heaviest load, that withstands the highest speed—through extremes of weather and service conditions, is the one of superior quality?

GALENA OILS have done these very things for years and the records of their performance are actual figures of operations on not a few, but hundreds, of the steam and electric railroads of America.

IS it not also a reasonable conclusion that the quality that proves itself by such tests is the quality that will protect and save bearing surfaces, thereby reducing repairs and depreciation in equipment?

This feature of lubrication cost is today gaining recognition by efficient operating officials, who realize that the costs of oils are relatively small compared to equipment costs. There are many instances where GALENA OILS have more than saved their cost in reduction of repair bills alone.

TRIGRAM
G S O
C
TRADE MARK

THE GALENA-SIGNAL OIL CO.
NEW YORK FRANKLIN, PA. CHICAGO
Offices in all principal American Cities
LONDON BUENOS AIRES PARIS

GALENA SERVICE

Preserve Original Equipment Quality

G-E coils are wound by experienced G-E workmen on G-E forms in G-E shops for G-E motors. They are *exactly* the same as the coils that were in the motor when it was shipped new. Therefore, they will not be too loose or too tight (either condition breaks down the insulation and shortens the life of the coil), but they will fit *exactly*. It is unreasonable to expect coils made in any other way to attain the same perfection.

G-E Coils
Fit G-E Motors

40-81

General Electric Company

General Office
Schenectady, N.Y.

Sales Offices in
all large cities

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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G. J. MACMURRAY, News Editor W. R. ANDERSON, Assistant News Editor

Volume 57 New York, Saturday, January 1, 1921 *Number* 1

Happy New Year! Have Faith in Your Industry!

IT IS with very best wishes for the New Year that the ELECTRIC RAILWAY JOURNAL sends forth this first issue of 1921 dated Jan. 1, which will not happen again for six years, or in 1927. We wish a Happy New Year to the various companies and men associated with the companies and we see every reason to believe that the year will turn out to be a prosperous one. There is an undercurrent of optimism which cannot be mistaken. The railways are on the up grade and going strong.

In saying what we have we do not overlook the difficulties ahead, the problems to be solved. But difficulties and problems are always with us. Life would be monotonous if they were absent. It is merely that they are different ones in 1921 from those which have gone before and been long since overcome or solved successfully. We comment later on some specific present-day conditions. What we would emphasize here is that if there is one who is discouraged on account of present troubles as he sees them, if there is one in the railway industry who has lost faith in its future, let him give place to one whose faith and enthusiasm will allow him to conquer the problems which confront him. Optimism, ability and hard work will accomplish wonders. The electric railway industry is the industry which the men in it make it. If it is successful, they are to be thanked; if it suffers reverses, introspection is at least necessary to see if they are not responsible.

As we have said before, we have faith in the men of the industry. To those who doubt we would say:

Have faith in the industry—or get out!

Happy New Year!

Tendencies in Fares and Fare Collections

WE HOPE that during the coming year progress will be made in determining the best basis for fares and methods for their collection. The trend during the past year has undoubtedly been toward an increased flat fare, but the satisfaction given by the zone system where it has been tried, on about ten properties, shows that it also has claims for consideration. The most serious objection to its use remains in finding a convenient method of collecting the fare so as to prevent over-riding. Where with a flat fare tickets are sold at a reduced rate, the tendency is very clearly toward the use of metal tokens, and in all cases the fare box, either locked or registering, is growing in popularity.

In spite of reductions in the price of food and some other commodities, the time has not yet come when electric railway fares can be reduced. Labor and coal, the largest items in the operating expense account, are still as high as ever. Moreover, a great deal of rehabilitation will have to be done if the properties are to give the service which the people want, and they can be rehabilitated only if their credit is re-established by reasonable net earnings. Nevertheless, the time will come, if the country gets permanently on a less expensive scale of living, when fares will become less. Right here is a suggestion for the city where service at cost is being considered. In those cities which are on a service-at-cost basis this change will come about automatically and promptly without the necessity of extended hearings or any further readjustment of franchise relations, whereas this may not be the case in those localities where the company is permitted by franchise to charge a specified rate.

The experience of the past few years, hard as it has been, has had at least certain advantages to the railways. Not the least of these has been a general realization of factors in operating expenses which previously had been overlooked in many cases. This knowledge will be of value in any readjustment of fare necessary during the coming years. Railway companies now know that in order to keep their property intact they must consistently set aside from their earnings from 3½ to 4 per cent of the value of their renewable property each year as depreciation reserve. The lesson, though a dear one, may be worth all that it has cost.

Conduct Your Business as If You Had a Competitor

WE HOPE to see during the next twelve months more effort made toward merchandising transportation than ever before. Electric railway companies can no longer think that they can develop the maximum traffic possible on their lines simply by running cars. Necessity riding will come, it is true, without being sought, but this class of riding is small compared with that possible if a vigorous effort is made to obtain more.

The means for merchandising transportation are multifarious. They include many things which a large number of electric railway companies have already done and are doing every day, such as providing attractive cars, having them promptly at the points where they are needed, operating them at the speeds and over the routes desired by the majority of patrons, etc.; in other words, giving good service. Such a policy will win many passengers, just as the sale of reliable goods in a store will win many customers to the owner of that store, but few merchants would be satisfied with this as the sole inducement to attract buyers. Wide-awake merchants feel that they are not good salesmen if they do not strive continuously to impress upon the public the good quality and reasonableness in price of the goods they have for sale as well as the high grade of service to customers which they aim to provide.

Much of this effort on the part of the merchant undoubtedly comes because he realizes that he has competition in his business, and much of the lack of corresponding effort by the average railway man arises from the belief that he has no competition. This is the reason for the injunction at the head of these remarks, *i.e.*, "Conduct Your Business as If You Had a Competitor." Actually, of course, as the committee on merchandising transportation pointed out in its report at the last Atlantic City convention, every electric railway has competition of a very active kind. This comes not only from the public and private automobiles but, more important in most cases than either, from the sidewalk. The railway company must do as a merchant would do when he sees business which he wants going to a competitor. He studies the inducements offered by the competitor, the automobile or the sidewalk, and how many persons are patronizing them and how the company can best meet this competition with the service which it supplies.

This is what we hope the electric railway companies will do in increasing ratio during the coming year. We hope that each large company, and as many small companies as can do so, will add to its organization a "sales manager," whose chief duty will be to increase the sales of the company by every legitimate means. We expect to say more about the need of such an official in succeeding issues of this paper, but mention the point now because we consider it an important one. Such an official, as we visualize his duties, would have little to do with the details of the direct operation of the lines. His principal job would be to increase sales, though this would of course include advising the superintendent of transportation of the changes needed to make the service more popular.

Engineers Getting Together and Pushing Conservation

NEVER since engineering attained large proportions have engineers pulled together as they have during the past year or two. Undoubtedly the war helped to bring this about, but it is also the outcome of united effort, begun well before the war, to bring the engineer out of his shell and make him an influence in civic affairs. The engineers are numerous enough and well enough trained to warrant them in exerting a potent influence in the affairs of the country. They are beginning to realize this, and during 1920 they effected a federation of their national societies so that they can function as a unit when such functioning is desirable.

The engineers are getting together in other ways also. They are breaking down the barriers which have separated them into distinctive groups of civil, mechanical, railroad, marine and a hundred other types of engineers and are holding joint meetings for the discussion of topics of joint or general interest. This is noticeable in the gatherings of the sections of the national associations, which seemingly in most cases are now joint meetings. This is in the direction of economy of time and the promotion of fraternal feeling.

A large part of the thought of engineers is now being given to conservation. As a people we are extremely wasteful of our resources. We have so much that we have little incentive to save. There is only one factor that we, speaking for our country as a whole, understand, namely, high prices. When prices are high conservation is favored. Engineers are different from the rank and file of the people, however, for their profession is founded upon economy. An engineer is simply a person who builds or operates something more economically than other people. But the voice of the engineer has not been heard in the land nor in the Halls of Congress. It has been confined to his own circle, consisting of those who essentially agree with him. He has produced wonderful results in his special line and has laid the foundation for the prosperity of the country. And the country knows it. But as for influencing general conservation, that is another story.

It would not be fair to the engineering and scientific bureaus of the government, such as the Bureau of Mines, the Geological Survey and the Bureau of Standards, as well as the Departments of Commerce and the Interior, to give the impression that their efforts at conservation are not appreciated. This is far from the case. They are doing a great work. A remarkable example is the super-power survey now being made for the Department of the Interior by W. S. Murray. Here is an instance in which the power resources of the country's most congested industrial district are being comprehensively studied with a view to giving it a more economical and reliable supply of power. This is one of the achievements of 1920. The data for the report are now practically complete and the report will be ready within a few months. This super-power survey has enough of the spectacular in it to attract general attention, and at the same time it appears to be meeting with the approval of many of the power interests. Let us hope that the survey work will be fruitful in bringing about a saner use of our power resources.

This idea of conservation is behind a considerable number of engineering developments of large or small scope. It has given an impetus, for example, to the interest in using pulverized fuel in power plants. There has accumulated a vast store of fuel waste which was considered economically unreclaimable. In powdered form it now becomes available in competition with bituminous coal at present prices. Aside from the use of waste fuels, there is much interest in the pulverized firing of coal in competition with stokers. The whole matter was considered important enough by the American Electric Railway Engineering Association to cause it to be made the basis of a special report at the 1920 convention, and it will undoubtedly come up for discussion again from time to time.

In the line of conservation also, but conservation of labor and line material rather than fuel, is the automatic substation. This has made steady progress during the past year and the outlook for 1921 is promising. In fact, as finances permit, a general switching over to automatic control seems inevitable. There are still many technical problems in this field to be solved, but wonderful progress has been made.

One of the biggest fields for the engineer in the conservation movement is in heavy traction. On account of the unsettled state of our railroads during and since the war they have not been able to give the subject much attention, but they must do so soon. In the meantime Europe and other foreign sections are going ahead, impelled by the critical fuel situation and the prevalence of water power in many parts. The situation abroad is covered rather fully in an article elsewhere in this issue.

Finally, we must not forget the slogan "Do it mechanically." In spite of the excellent progress made in the development of tools for indoor and outdoor work, much more can be done. As R. C. Cram says in his review of the track situation in this issue, there are certain operations in that field that have resisted effort to substitute machinery for hand labor. The same is true in other departments. There is need for good engineering at this point.

A Financial Program for 1921

THE electric railway industry today, backed by the reports of the Federal Electric Railways Commission and of the public utilities committee of the Chamber of Commerce of the United States as being an essential industry, still finds itself with financial problems of no mean magnitude ahead. It is reassuring, however, to see, in the face of the great industrial depression of the past few weeks, the continued usefulness of the railways, as evidenced by the traffic, and also the apparent success which the industry as a whole has eventually had in gaining fares which are at least commensurate with the cost of rendering service. But the test of the success will probably come in 1921, for there is now to be considered more than the immediate problem of merely paying the cost of service, which has been the chief trouble in the past four or five years. We refer by this to the problems of really stabilizing the finances of the industry, of refinancing many railway security issues and of taking care of deficiencies in earnings and in maintenance and, in many cases, of actual depletion of property which have occurred during this period, as is so well analyzed by L. S. Storrs in this issue.

"Restoration of credit" is a phrase worn almost threadbare in the railway industry today. "Educate the Public" is in the same category, though we certainly urge no cessation of effort in response to either of these sayings. But we must examine what the industry, as an industry, can do; what can railway managements and directorates do?

We suggest a careful study of that part of the interview with President Gadsden, printed in this issue, in which he recommends a financial program for the industry. There are many men in the industry who agree with his recommendations as to simplification of financial structures, and we see every reason to support these suggestions. We refer to a recasting of the financial structure so that the total amount of capital securities issued, expressed in terms of par value, equals the value of the property. It must be realized, as some in financial circles and in positions to have an influence in formulating the policies of the companies have not yet fully realized, that the electric railway is a public utility, regulated by the public, and that therefore the financial structures necessary and desirable in the early days of the industry, and probably still necessary and desirable in private and unregulated competitive business, may not now be the best to have in this industry.

A reference to the statistics on receiverships and foreclosures which are given elsewhere in this issue will show two things, as pointed out in the introductory remarks preceding the tables: First, that there have been fewer receiverships in 1920 than might have been expected in the race to overtake expenses with income, and that the total money involved is relatively small; and, second, that most of the receiverships which have ended in 1920 have ended through more or less drastic financial reorganizations or else through complete abandonment or junking of the property. It is both pertinent and wise to consider at this time, too, that there are several companies not in receivers' hands and not under foreclosure which are, however, in default of some payments of fixed charges which are more or less serious. This list has its encouraging feature in the indication that security holders see conditions growing better and prefer to let the companies regain their stability without outside interference, and we believe this to be a legitimate attitude. But the situation as a whole today, while showing every indication of returning to a healthy condition, is thus shown to be one with its dangers. The year 1921, some have said, is crucial.

What is needed to meet unprecedented conditions are unprecedented methods, methods certainly which are based on fundamental economics, and also which recognize the human factor, the psychology and knowledge of the public served. The power lies with the directors of the various companies. The managements, who are closer to public opinion and whose whole energy, attention and devotion are centered in the individual properties, in contrast to the average director, who is interested in many properties and is forced to look chiefly at the financial statement for his knowledge of any individual property, must have the courage to bring constructive measures to the attention of their boards.

We are glad that "Electric Railway Financing" is to be the topic at the mid-year conference of the association. It is to be hoped that, as a result of the discussion at Chicago, definite measures will be outlined for railway men themselves to do toward restoration of electric railway credit.

Constructive Legislation Should Be a Feature of 1921

IT IS with more interest than usual that we approach the legislative season of 1921, when some forty Legislatures out of the forty-eight will be in session and when also the National Congress is busy with a legislative program that is all but staggering. From the standpoint of public utilities, and especially from the standpoint of electric railways, more intelligent legislation than ever before should be expected.

Past years have seen too much of popularly encouraged anti-utility or utility-restrictive legislation. They have also seen too many legitimate and constructive pieces of legislation affecting utilities fail to gain public approval, being passed without a general education of the public, although with full and open discussion in the legislative chambers. This year the people have before them the results of two complete and unbiased investigations of the electric railway industry. No industry has ever before been subjected to such analytical scrutiny or had the opportunity to benefit from the results thereof. It is, therefore, with a feeling that the public and the legislators are both better informed than heretofore that the legislative season is approached with optimism. If the public is not so familiar with some facts as we would wish we have largely ourselves to blame.

Another aspect of this situation is that in many states constructive utility legislation is an avowed purpose of incoming administrations and of reconvening legislatures. Unfortunately this is not universally true; in some states the utilities are still the football of politics. But, by and large, there is a desire to remove such restrictions and make such advances in legislative enactment as may be necessary to encourage utility development to meet the needs of the communities.

There will doubtless be some attention paid to the laws governing public utility commissions. Some of these have come under legislative fire for the first time because they have been courageous enough to do their duty in the face of shortsighted public opinion and demagogic political pressure. It is to be sincerely hoped that any and all legislation in this line will be of a nature to strengthen the commissions and to raise them to a position where they can more than ever command public esteem and confidence.

Electric railway men have their own work to do in this legislative program. Better than any others they know what is required and what is good or bad. Is it not the more bold and courageous thing to do to assist openly in formulating constructive legislation which will react in the development of better public service and at the same time better public confidence?

Labor and Wages During 1921

WITH the cost of living promising to be less during the coming twelve months and with unemployment in other industries increasing, the wage question for electric railways must be fairly met during 1921. According to statistics compiled by Professor Richey from a number of street railways there has been an average increase of 25 per cent during the year which has passed in the hourly street railway wages paid in the section east of the Mississippi River. Based on an index figure of 100 for 1913, the figure in December, 1919, was 186 and in December, 1920, it was 232. The peak was reached in September, 1920, when the December figure of 232 was attained. While the compilation is based largely, as we understand it, upon city properties, the figures probably are not very far from being representative of the industry as a whole, though to get the average wages per hour an allowance would have to be made for the way in which the wages were loaded; that is, the allowances made for overtime, making out reports, etc.

In changing their wage schedules it is obvious that electric railway companies cannot follow the course open to manufacturers when operation ceases to be profitable, namely, to shut down for a week or a month, then reengage a staff. We believe, however, that when the proper time comes for a readjustment the men as a whole will meet the companies in the matter of wages in a broadminded way, recognizing its reason in lower living costs. But we also want to point out very distinctly that lower labor costs may be obtained in other ways than by reducing the maximum rate per hour.

One of these ways is to modify the loadings on the wage scale to which reference has already been made. Another method is to extend the period before the highest rate is paid. We believe the present period of one or two years, as established by the War Labor Board, is entirely too short, both as a matter of justice to the men and as a rating for efficiency in operation. It often takes a year or more for a man really to decide whether he likes the railway business and is fitted for it. It is hardly fair for such a man and for the man who takes up railroading as a stop gap between other lines of work when his own trade is dull to be able within a year or two to be put on a par, as to wages, with the men of longer training. Five years is a fairer period. A man who has worked that time with satisfaction to himself and to the company may be regarded practically as a fixture, and such a man is worth more to the company.

More extended use of the one-man car offers another means of maintaining high wages, while reducing operating expenses. The opposition of organized labor to this car is growing less, if we take as a criterion the acceptance by the men of the Eastern Massachusetts Street Railway of the decision in favor of these cars rendered on Nov. 8 by the Massachusetts Department of Public Utilities. In this connection it is well for any wage schedule to define the usual bonus for one-man car operation in percentage of the basic scale rather than in cents per car-hour, so as to simplify such changes as may be necessary from time to time by making them refer directly to the basic rates.

We see also in the coming year a better grade of employee seeking engagement in electric railway work. In the past, before the hectic period in industrial production during the war, electric railway employment appealed to men who wanted continuous service, in season and out of season, and who were not afraid to work. During the war, many good railway employees left because of the high wages paid in other industries. But those who stayed on now realize that theirs was the wiser course. Steady work at regular pay is far better in the long run than a somewhat higher hourly rate in a job which may stop any day, and no one realizes this more now than the motormen and conductors who have stuck to their positions during the past few years.

The Interurbans Require Greater Attention

INTERURBAN development has been practically at a standstill during the year just closed. The reason for this situation is of course the inability of the companies to finance new capital issues. Despite further fare increases during the year on a great many interurban properties, advances in operating expenses have nearly kept pace with them, so that the year is closing with little financial improvement over that prevailing Jan. 1, 1920.

To this general condition the competition of the private automobile, the motor bus and motor truck have contributed an increasing pressure. While we thoroughly doubt the likelihood of the motor bus or motor truck supplanting the electric interurban in any far-reaching way, yet the immediate effect is serious, for the advent of this new, much advertised, much overrated form of transportation has brought a formidable doubt into the mind of the investor as to whether his money may be invested safely and wisely in the electric interurban. This, then, would seem to be a temporary condition which may be remedied as time affords experience on what the limitations of the automotive vehicles are, on how better to meet this competition and on how to "sell" electric interurban transportation.

We feel that these things indicate that the interurban situation is more difficult than has been generally realized, judging from the scant attention given during the year to exclusively interurban problems. Little effort has been devoted to detail and searching studies looking to the betterment of operating practices and coincident economy. Hence we feel that the year 1921 must see more attention given to the interurban problems in association activities and in the thinking of the industry generally.

Looking into 1921, it seems to us that certain desirable lines of activity are apparent from an analysis of conditions that prevailed in 1920. The new year should be made to bring changes—changes looking toward improved earnings and decreased expenses. For example, there is opportunity for great improvement in the system of fare collection, judging by the experience of the several companies that have installed a zone check system of identifying passengers and checking turn-in. There is much to be done in the way of schedule revision to make the service more nearly fit the traffic available. This applies to both freight and passenger service and implies in one case the substitution of every-other-day instead of every-day shipment of l.c.l. matter from way stations where there is not adequate business to justify the handling of a car a day for that station, and in the other case, the arrangement of departure time of cars to fit traffic, without regard to the position of the hands of the clock. There is much saving to be accomplished by the application of energy saving devices which in most cases can be counted upon to finance themselves through the savings made at the coal pile. There is also a splendid opportunity to apply principles of merchandising to the sale of interurban transportation.

Again, there is the possibility of increasing fares. On some properties a further increase is justified and could wisely be asked and inaugurated. However, on many others, if one is to judge by the experience the steam roads are now having with traffic dropping off, undoubtedly due in large part (at least as far as the non-necessity riders are concerned) to the heavy fare increase, it may be well to be very cautious about increasing fares above the present level.

All these suggestions thus far may be put into practice without requiring new money. There are many other things that can be done to great advantage if the general condition of the money market and position of the individual company is such as to make possible the necessary financing. For example, a further standardization of equipment and provision of other facilities for an expansion of interchange service between properties offer a field for increasing earnings, particularly in the Middle West. This would improve passenger traffic and open the way for a very substantial increase in the amount of high-rate package freight carried. Even if it is impractical to undertake the handling of carload freight in a large way there is an enormous amount of this l.c.l. business which the interurbans can secure by virtue of superior service. In case after case it is lack of facilities to handle the volume of business that would be offered, that is turning this business to the steam roads and more recently to the motor truck companies. And the latter are likely to develop into formidable competitors unless the electric railways go after this business in a big way and expand facilities to handle it in a big way. In this connection, there is also the possibility of employing motor trucks as feeders of l.c.l. business to the interurban line, the railway company either owning such truck lines or co-operating with separate companies owning them.

One of the projects that would be of enormous value to most interurban lines is the building of new entrances into large terminals to avoid running over public streets. Unfortunately this usually involves enormous capital expenditures, yet there are two or three cases where such a project is awaiting only more favorable material and labor prices. High-speed service has produced a marked increase in passenger traffic on one important road. This service was anticipated by improvements to roadbed and the purchase of cars. Another and very important economy of which advantage may be taken is that afforded by the automatic substation. The labor saving, power saving and better voltage regulation made possible warrant serious consideration being given this means of reducing the cost of energy.

Quotation from the Federal Electric Railways Commission Report

No. 1

THE electric railway furnishing transportation upon rails is an essential public utility and should have the sympathetic understanding and co-operation of the public if it is to continue to perform a useful public service.

The experience of seventy-five years, the unanimous opinion of expert witnesses, and of those who are students of transportation problems, and the assumption of the necessity for tracks by inventors working to improve the methods of street transportation alike demonstrate the fundamental and permanently essential nature of the railway—and to the present time of the electric railway—as the most nearly adequate, reliable and satisfactory system available for transporting the maximum number of people through the streets of our cities with the least interference with the use of these streets for other purposes of public ways.

As to the outlook for the building of new interurban lines, it is entirely possible that the expected reduction in material and labor costs will start a number of new projects. The proposed line between Dallas and Wichita Falls, Tex., is practically assured under improved general economic conditions. There are also a number of other lines proposed in the Middle West as substantial extensions to present systems which may be expected to materialize with return of conditions more favorable to such work. It is also a fact that serious consideration will be and should be given to the use of the motor bus in many locations needing new transportation lines. For it is in matter of first cost that the motor bus line has its principal advantage over the electric interurban. The possibility of expanding present systems by this means can well be studied by interurban managements, which will thus co-ordinate the motor bus with the railway rather than permit it to become a competitor.

From these various aspects it seems that the year 1921 should be a very active one in the interurban field, particularly so because of the many things within reach to be done and the inactivity of the past year.

Annual Statistical Compilations Show Improved Conditions During 1920

IN THIS issue will be found the annual compilations showing in detail all new rolling stock ordered, track extensions, track reconstructed or rebuilt, together with comparative figures for the past ten years. There are also tables showing track abandoned and ripped up as well as track on which service has been entirely suspended without removing the track.

It appears from the summaries of cars ordered that conditions in the industry are somewhat better than a year ago inasmuch as the number of cars ordered is approximately 50 per cent greater than in 1919. The same conclusions can be reached from the table of companies that have gone into the hands of receivers during 1920. The number is materially less than in the previous year and the amount of securities is likewise smaller inasmuch as the number of large companies involved is less.

Taken as a whole, conditions seem to be somewhat improved for the manufacturer. This is no doubt due to the results of the several fare increases which are gradually restoring the purchasing power of railways to about the condition that should have existed during the war period. With the decrease now impending in the cost of supplies and the better conditions existing in the labor market an optimistic view is taken that 1921 purchases should exceed those of the past year.

Ask the Car Rider

President Gadsden Says the Outstanding Problems of the Industry Must Be Eventually Answered to Satisfy the Car Rider—The Uppermost Problem of the Industry Is to Rectify the Credit of the Railways—This Is an Inside Problem with the Public Co-operating—There Is No Time Like the Present to Do Whatever Housecleaning Is Necessary in the Industry

By Harold V. Bozell

"'ASK the car rider.' How would that do for a slogan to test the answer as to what to do in the various problems facing the electric railway?" said Philip H. Gadsden, president of the American Electric Railway Association, as he was discussing the outstanding problems confronting the industry and what the industry itself could do to solve these problems.

Mr. Gadsden was sitting at his desk in the United Gas Improvement Company Building in Philadelphia, where he directs the public relations work of a large group of public utilities. And good public relations are uppermost in his mind as the real rock bottom solution of most public utility problems of the day.

He is a straight and fearless thinker—and doer—this new president of the association. He is wrapped up in his work and is fully conscious of both the responsibilities and the opportunities of his new position as representative head of one of the country's greatest industries. He is anxious to do what he can to effect progress in the electric railway business and he tries clearly to outline the difficulties ahead. One is impressed with his desire to face all problems and facts as they are and not to dodge an issue because it may be unpleasant or distasteful. He had a great opportunity to test public and group opinion when he served on the Federal Electric Railways Commission, which he was instrumental in forming and for which the industry owes him its gratitude, and he is acting with that experience as a background.

PHILIP H. GADSDEN
President American Electric Railway Association

He wants the railways to win public confidence, which after all is the basis of the credit so badly needed.

It is a pleasure to talk to him and gain his inspiration.

"The car rider will usually have the correct answer, in simple language, to many questions which confront us," he continued. "Ask the car rider, for instance, if he wants to pay for paving between the tracks. Ask the car rider what sort of service he wants, and if he is willing to pay for it. It really is a pretty good test of our own conclusions to try to predict what the car rider's answer will be to most of the problems confronting the industry today."

"What do you consider the uppermost problem of the industry to be, Mr. Gadsden? What are the things which the industry itself can do so that it may better perform its functions?"

"Restoration of credit is, of course, the uppermost problem that we have in front of us today. We must approach this problem squarely. It appears now that the work of getting a recognition by electric railway men themselves of the part the industry itself must play in this restoration of credit will prove to be even harder than the restoration of credit once the recognition is given. But the men in the industry must realize, 100 per cent, that it is largely an inside problem.

"Electric railway men must recognize that they and they primarily have to do whatever necessity demands in order to rectify this credit situation. Much of what has to be done may not be liked by some people, but this much is certain: It is absolutely essential that present investment be stabilized before it is possible to invite or induce new capital to come in and there are certain economic principles with which it is necessary to comply before this can be accomplished. Railway men must get down to brass tacks, study economics and the car rider's mind, and do the necessary things no matter how distasteful they may be."

"You regard it as an internal problem then, and not one to be passed on to the public?"

"Yes."

"Have you any suggestions as to the actual road which the industry must travel in order to restore this credit?"

THE INDUSTRY SHOULD ANNOUNCE ITS STAND

"For one thing, it must be recognized that not only is it an internal problem but that it is a problem for the industry, *as an industry*, to do. There is such an interrelation existing between the various electric railway properties that it is not a problem for individual action here and there over the country, but it is a problem for the industry as a whole, in so far as general principles are concerned.

"The program which I favor very much would be to have the industry state in a formal way, make a public announcement, that it accepts in principle the report of the Federal Electric Railways Commission and also the report of the public utilities committee of the United States Chamber of Commerce.

> **"The industry should announce that it recognizes the principles laid down in these reports as voicing the best informed opinion of the public as in the interests of restoring the credit of the industry. The people, through two disinterested bodies, have expressed their conclusions and they deserve, and will demand, to know where the railways stand.**

"I think this would be an excellent move for the American Electric Railway Association to make. As representing the industry as a whole, the association could make the announcement mentioned above and say that the railways of the country are prepared to go along that line of action if the public itself is willing to do likewise.

"Naturally, each locality has its special problems and must work out the details of the case in view of the particular conditions surrounding that case. But, broadly considered, it is a problem for the whole industry, and the industry must be treated as a whole. I repeat that it must not be forgotten that each and every electric railway suffers from the wrongdoings and mistakes or weaknesses of other railways and investors quite generally refuse to put their money in particular railways until the stability of the whole field has been established. From this line of argument I draw my conclusion that we must do it as an industry, and probably through the association as the mouthpiece of the industry. Therefore, it will be very helpful if the association itself would come out with a formal statement along these lines."

"Wasn't a great opportunity, psychologically, just passed at the convention at Atlantic City, when such an action might well have been taken? It would have been a dramatic move, surely."

"Personally, I think that is true. Some of my best friends disagree with it, but that merely emphasizes what I said before that one problem which we must work out within the industry by ourselves is to gain an appreciation of our own opportunities and duties in this connection, to realize that it is our own problem and that we must, as an industry, state the platform on which we stand."

"How can the industry now best place this report before the public, and incidentally before itself?"

"The association's publicity committee is working on that now, and I have some ideas which we are formulating and which contemplate playing up in brief form and in some attractive way the conclusions and outstanding points in the analysis of the Federal Electric Railways Commission report and having this widely distributed over the country in railway offices, on car cards, and for use in various publications. We must use every means, of course. The details will be worked out by the committee."

"Mr. Gadsden, you have mentioned from time to time the suggestion that it would be wise for electric railways to modify their financial structures in such a way that the capitalization equals the officially approved or determined valuation. Won't you state your views on this concretely, and indicate how it would help solve this credit situation?"

"To answer that, let me first call attention to some provisions of any service-at-cost arrangement from whose study we may profit. You know I favor that form of contract. Now, to my mind there are two features to 'service at cost' from the standpoint of the restoration of credit. These are: First, that there is an official valuation of the property; and, second, a readjustment of securities of the property to conform to the valuation so found. This is an essential under such a form of contract, for as a rule these contracts guarantee a certain fixed dividend on outstanding stock. The limited experience which we have had with 'service at cost' tends strongly to show that this process has been largely instrumental in restoring public confidence in securities so readjusted, and to show further, and this, to my mind, is the greatest result, that there has been a building up of a local market for the kind of securities mentioned.

OPPORTUNITY FOR EXECUTIVE FORESIGHT

"If this is a correct statement of facts it seems very clear that the nearer the electric railways as an industry can conform their own financial set-ups to those principles the greater chance will they have of restoring the credit of the industry and building up a local demand for traction securities.

> **"Of course all of us realize the many difficulties in the way of bringing this about, but my own judgment is that the railway executive who is far-seeing enough to realize this situation and take advantage of it is going to place his property in a much more wholesome and healthy condition than one who does not.**

"Certainly the electric railways today have nothing to fear from fair valuation of their property. Taking whatever basis of determining fair value is finally agreed upon, it is impossible to make a valuation without recognizing the real intrinsic worth of the public utility and of arriving at a valuation which is fair to all concerned. We all know that in many cases the value, when found, equals and sometimes exceeds the capitalization. But whether it does or not, I believe the principle is a sound one to follow. The car rider can understand it, for one thing.

"There are many good men in the industry who do not agree with this viewpoint, but from the contact with all sorts of opinions which it was possible for me to gain in my experience on the Federal Electric Railways Commission I am thoroughly convinced that this would be a most healthy program for the railways to follow. It is one of the things which the railways themselves can do, and which if forced upon them from the outside will react only to the great detriment of electric railways in the further destruction of electric railway credit.

"With reference to the necessary new capital required from year to year to provide the extensions of the railway facilities demanded by the growth of our various communities, I think it ought to be impressed upon the public that unless the conditions and restrictions now imposed upon us, and which are largely responsible for our present want of credit, are removed there is very great danger that whether the American public wants it or not the electric railways will be forced into the hands of municipalities, for the reason that if conditions are such that private capital will not go back into the industry public credit must. The issue to my mind, therefore, is squarely made:

> **"If the American public, as there can be no doubt, are opposed to the municipalization of their public utilities, and especially of their traction systems, it is incumbent upon them to co-operate with the railway executives in doing whatever must be done to make investment in electric railway securities attractive to the private investor. We have been talking about steps which should be taken by railway executives to restore the confidence of the public. This is one thing which the public, it seems to me, can and must do.**

"What do you think of the application or the use of non-par value stock as an answer to the problem of restoring the credit or stabilizing the finances of the electric railway industry today?"

"I think it offers a very satisfactory and equitable solution of a most difficult and vexing problem. Stock is, of course, nothing more nor less than a right to share in the earnings of a company, and it appears to me that our corporate industries, and certainly our public utilities, would be in much better shape if the stock were issued on a non-par value basis. Every one is fully protected; the return is allowed upon the actual property in the service of the public; the fixed charges of interest on bonds, which would of necessity be conservatively floated, would be recognized by all and the non-par value stock would gain its earnings in proportion to the service rendered by the electric railway and the efficiency with which that service was rendered.

"In this discussion I wish it to be understood that I am convinced that the question of bonus stock or so-called overcapitalization has been greatly exaggerated in the public mind and that whatever bonus stock was issued was necessary in the promotion days. That does not eliminate, however, the vulnerable feature today, and we should recognize that fact.

"There are two ways of strengthening the basic financial structure. One of these is to adjust the securities until their par value equals the valuation of the property, and the other, and I believe much more preferable way, is to change to non-par value stock.

"I am very hopeful that the industry will face this problem squarely, realizing that it is an internal problem, and that the financial structures of the various companies will be made simple enough for the car riders to understand. Understand me, I favor no change in the total return on account of any shift in par value; that is determined by the actual valuation of the property. I am not criticising, but rather upholding, the corporate organizations and financial structures as they have had to be built in the past. But to meet present-day conditions and present-day public policy some change is desirable in the capital structure of some of our companies."

"There is another question which seems to be preying upon the minds of the public in many places, and that is the one of underlying leases. It has been used by political demagogues so often that a discussion of it is pertinent, at least."

"That, it appears to me, is merely another question of inside-the-house cleaning. The public isn't interested at all fundamentally in what our arrangements are with each other, so long as it realizes that all it is paying is a fair return on the fair valuation. But I think we must realize that the time has come when the public will insist upon paying only a fair return on a fair valuation and that we must make our own arrangements with each other, so that we can exist individually and collectively on that basis. Naturally, fixed leases made a good many years ago are points of attack for politicians, whether they have any effect on the actual rate of fare paid by the car rider or not, but what the car rider will insist upon is that they do not have any such effect. His attitude is: 'What's your total property worth? What does my ride cost, with a fair profit to you? Eight cents? Ten cents? Well, take my dime and divide it any way you want to.' "

"To refer again to the service-at-cost franchise principle which you mentioned, its adoption was one of the recommendations of the Federal Electric Railways Commission, was it not?"

SERVICE-AT-COST ADVANTAGES

"Yes, it was suggested as a fair solution, and I see many advantages to that form of contract. There are places, of course, where difficulties have been found with the particular form of contract made and none of the service-at-cost franchises is perfect in providing a real incentive to management. That problem must yet be worked out. But at bottom there is real incentive to the owners.

"I think the following is a fair statement: capital is fluid, in other words, it flows to attractive conditions, and if the cost of money is, say, 8 per cent and this is sufficiently protected in the terms of a service-at-cost franchise and backed by public opinion, there should really be no necessary added incentive to induce capital to go into an electric railway operating under such a franchise. Service-at-cost franchises recognize that the electric railway business is an investment business and not a speculative business any longer. But I do think there should be some incentive to better management and I am hopeful that there will be a real way found to include this satisfactorily in such transactions in the future.

"Still, as to management, it appears to me that there should be no reason to doubt that there will be good service. Just consider the general manager; his professional reputation rests upon the results he obtains; he is compared with managers in other communities; a certain morale is thus created which is worth more than any monetary reward.

> **"As a matter of fact, I believe that the morale in public utility business is extraordinarily high, and in the electric railway business this is specially true. I often compare it to the morale of a good military force. Certainly during the past trying years electric railway managements have measured up to the highest standard of public duty.**

"But I must admit that a solution satisfactory to all with reference to the proper recognition of good management under service-at-cost franchises has not yet been found."

"There are two other points of interest to railways today, Mr. Gadsden, that it would be profitable to have you say a word on if you will. These are labor conditions and the place of the motor bus. One question with reference to the former is the wage scale. Certain cuts in wages have already been made in other industries and what is the future on the railways?"

"Well, we must first recognize that we can't expect to lower the wage scale until a reduction in living costs has become a fact—so that the electric railway man on any new scale can live as well as he can now. In other words, the method of determination of satisfactory wages will be somewhat on the basis of their determination during the war when living conditions were taken into account.

"With reference to the cuts which have been made in other industries, I interpret this as meaning that labor in industries which are not public utilities prefer to work at a partly reduced compensation rather than to run the risk of having the industry close down entirely. We must recognize the fact that public utility labor does not have this fear, for it knows it is in a business which must continue to run and it would fight reductions to the limit.

WAGE SCALES AND COLLECTIVE BARGAINING

"I do see a way in the future, however, when living conditions have lowered sufficiently to make it possible for railways to get help at lower wages, and this is already beginning to be the case; what I have in mind is to make no change in the agreement with the men now on the railways, but to take on new men at lower rates, leaving the higher rates for men of long service and greater ability. I notice that the ELECTRIC RAILWAY JOURNAL has proposed this plan editorially as a solution, and I think it is a wise one. I think it is a solution which should appeal to labor as well as to the railways as the easiest means of going back down the scale as the general price level recedes."

"And as to organized labor or the open shop?"

"Well, all I can do is to give my opinion as a result of my own individual experiences, but I think there is no doubt of the fact that every one recognizes the right of labor to organize today or, expressed in another way, the right of collective bargaining. If that is the case, and the men on a given property decide to get together, I believe there is greater harmony and unquestionably greater efficiency, as a matter of practice, if the men all go in or all stay out. In other words, let the representatives of the men represent all the men rather than having various groups continually coming to the management. The men are better in one organization and not broken into groups. This is another inside-the-family arrangement, with the family in this case in the rank and file of the men themselves. But managers and executives of properties should reserve the right in the first instance to engage men either in an organization or out of it.

"One of the points emphasized by the commission in its report is the necessity of working out some plan by which harmonious relations can be maintained between the managements and the men, and strikes thereby avoided, as one of the essentials to the restoration of the credit of the industry. I think we cannot emphasize the point too strongly. The investor naturally hesitates to invest his money in an industry which is subject to recurring interruptions of service growing out of controversies, over either wages or service, between the management and the men.

"Therefore, in the highest interests of the property itself, a serious effort should be made to arrive at some satisfactory relation within the industry. But I feel that the details of the problem of how to work out relations between labor and management are for each individual property to work out to fit its conditions, though we may be able to arrive at some fundamental conceptions common to all."

"And what of the railways and the motor bus?"

"I can't see any answer to this question except that the railways themselves must adopt and use the motor bus in its correct economic sphere. It may sometimes mean running motor buses at a loss, but it is better to run them at a small loss than to be forced to run cars on rails at a higher loss. The motor bus certainly has a field as a feeder, as an auxiliary service, and probably in the handling of peak loads where it does not pay to install extra trackage. Competition, unregulated or regulated, will bring no good to either system of transportation."

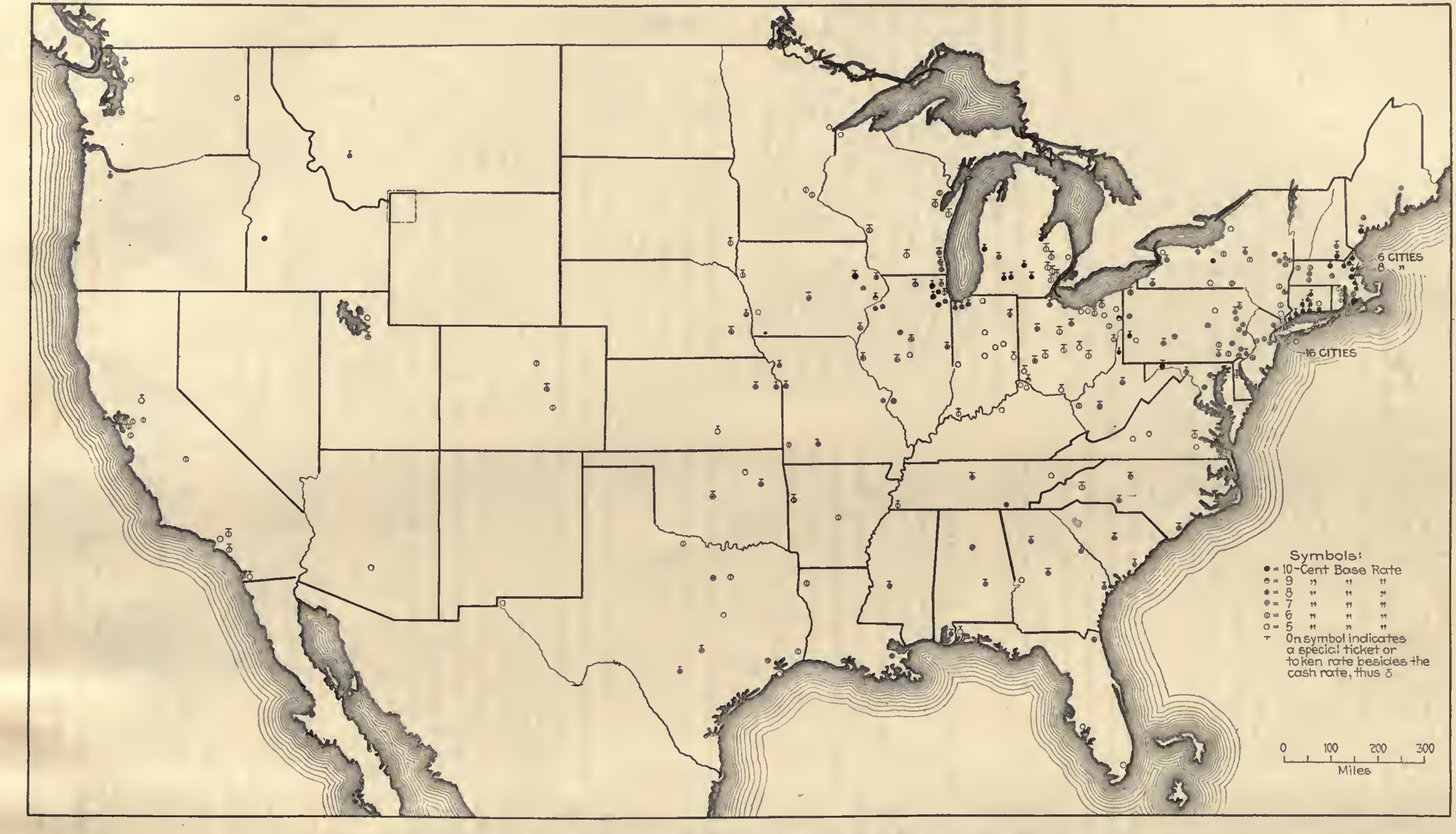
"You are optimistic as to the future?"

"One cannot study the electric railway situation and feel otherwise. As has been pointed out so many times, the electric railways are an absolute essential of community life. The testimony before the commission proved conclusively that their usefulness to their respective communities had increased rather than diminished, notwithstanding the extraordinary development of the automobile.

"As a rule, the electric railways have succeeded, at last, in securing rates of fare fairly commensurate with the service they are rendering. If we can succeed in maintaining these rates of fare, in the face of the prospect of a general decline in the cost of labor and material, the outlook for electric railways is very encouraging. While industry generally is slowing down, the experience of the past has shown that the business of the electric railways is affected but little by industrial depression. This in the past has made electric railway securities favorite investments on the part of the public, and, in my judgment, we are again approaching the period when our securities will be sought after by prudent careful investors."

I HAVE PURCHASED FIVE SUBWAY TICKETS FOR TWENTY FIVE CENTS.
WHICH ENTITLES ME TO RIDE ONE HUNDRED MILES.
ONE HUNDRED MILES FOR TWENTY FIVE CENTS, HOW CAN IT BE DONE WITH PROFIT ?
McCABE

HOW McCABE HAS PICTURED HIS CAR RIDER CHARACTER, "THE COLONEL" WITH A QUESTION HE CAN'T ANSWER



A Graphical Portrayal of the Electric Railway Fare Situation in the United States Today. Symbolic Representation of Base Fares in Use in Cities of 25,000 Population or Over. Zone Fares Are Not Differentiated

Our National Fare Experiment

How the Industry Has Tried to Meet the Problem of Continuing Adequate Service Without Imposing Burdensome Rates—Ever-Increasing Costs Have Kept One Lap Ahead of Fares—The Industry Has Delayed Fare Increases and Has Tried Zone Systems to Minimize Demands on Public's Pocketbook—Now that Fares Begin to Be Commensurate with Cost, Large Cumulative Deficit of Recent Years Is a Problem

By Lucius S. Storrs
President the Connecticut Company, New Haven, Conn.
Past-President American Electric Railway Association

DURING the past five or six years all industry has had to meet unforeseen and unprecedented conditions, as every one knows. Private business has met these conditions in various ways, but usually according to practices which were not different from its ordinary ones; that is, the usual law of competition and supply and demand was allowed to hold sway. Some business enterprises, which had never before been subjected to regulation, have had to conform to certain government restrictions and rules, and in some cases even to turn over operation, or at least direction, to government agencies.

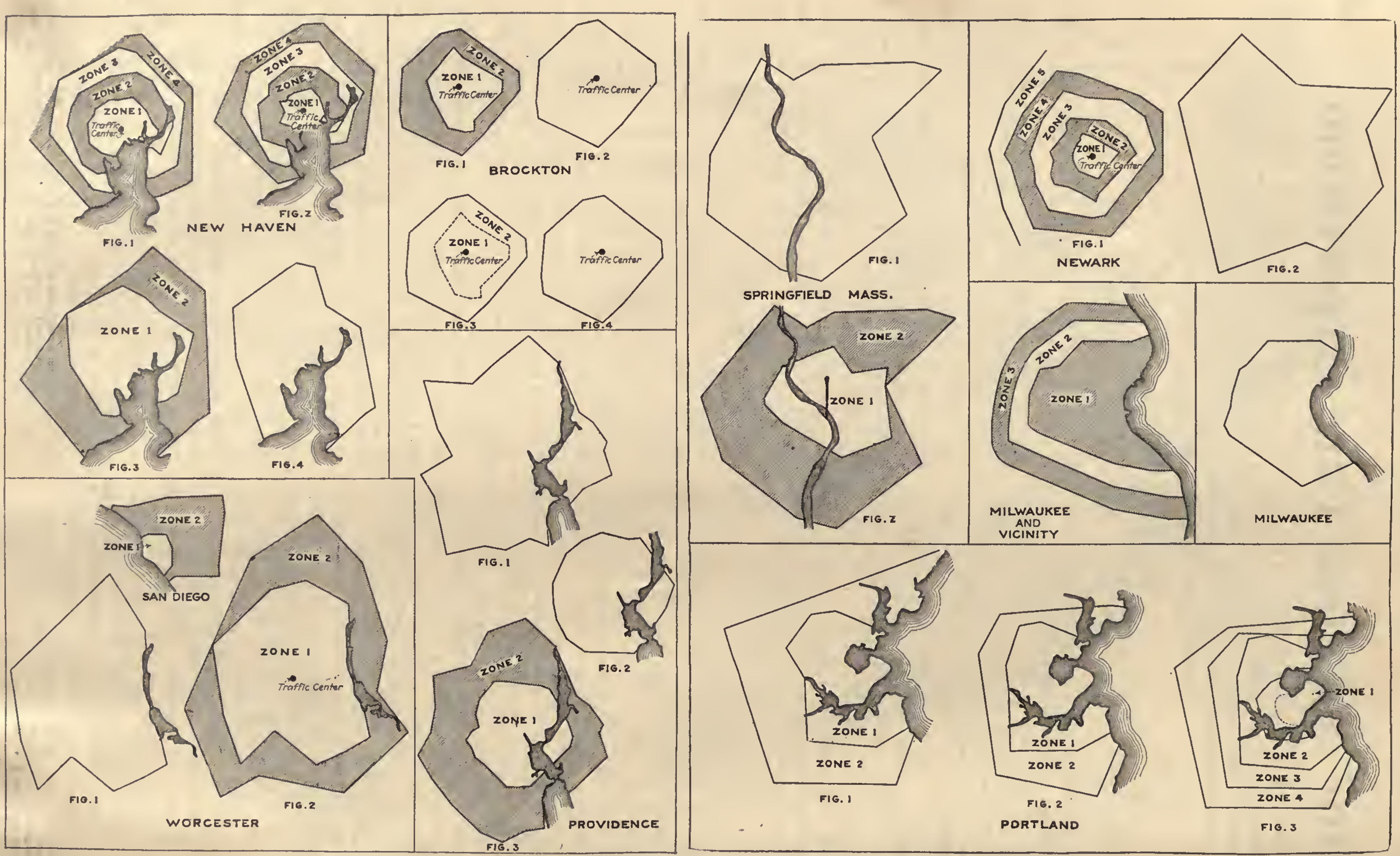
Through all this period the public utilities, and especially the electric railways, have had even more difficulty in keeping their business in successful operation. This statement, of course, is not novel either to electric railway men or to users of electric railway service. But in these new conditions there has been a continual struggle to keep properties alive and in operation, and the character of this struggle, viewed from the knowledge of today, appears to be a gigantic experiment in street railway fares from which the industry and the public may both learn some lessons. From this statement it is not to be inferred that the experiment is at an end and that final conclusions may be drawn, but rather that it is well to take stock of the fare development since 1914-15 to see where the industry is headed.

In this study there is no idea of duplicating the various fare studies and fare reports which have been made from time to time by the ELECTRIC RAILWAY JOURNAL and the American Electric Railway Association. Rather, it is the purpose to take a broad view of the subject as reflected by these various reports. Since 1914-15 the news columns of the ELECTRIC RAILWAY JOURNAL, for example, have carried item after item of "Fare Increase Sought," "Fare Increase Granted," "Six Cents in Smithville," "Seven Cents in Jamestown," "Another Increase Needed," "Eight Cents in Brownburg," "Ten-Cent Fare Granted in Jonesboro," and so on. From time to time the American Electric Railway Association has issued lists showing the fares in the leading cities. The last such list depicting the fare situation in all cities over 25,000 population, as of approximately five weeks ago, was published by the Association in *Aera* for December. This information, brought up to the date of this article, is shown graphically on an accompanying map of the United States, which has been prepared by the ELECTRIC RAILWAY JOURNAL. It gives a beautiful and telling story of the present fare situation in the country. Just a glance at the map indicates the variety of results which have been arrived at in this vast and nationwide experiment to solve the fare question. Practically every city indicated on the map has had a change in the unit rate of fare or fare system since 1914-15.

The premise upon which this article is based is that in 1914-15 there existed in this country throughout the electric railway industry a more or less standardized flat fare system of five cents for all urban rides. Usually free transfers were given—the so-called universal transfer system, in other words. Whether this was a situation which, upon complete and unbiased, social and scientific analysis, was the best that could be devised or was the most equitable to all interests involved need not enter into this discussion. There are some who believe that a distance tariff, such as is in vogue in many foreign countries, should have been in existence in this country at that time. There are some who believe that, even on a flat fare basis, it would have been possible to furnish transportation at less than 5 cents per passenger. But there are many operators who have had to furnish the service and many financial men who have tried to provide the wherewithal for proper growth of facilities who know or believe that, taken the United States over, the electric railway industry was not paying all expenses, making all necessary maintenance and depreciation charges and giving an adequate return to the capital which had made the industry possible on the 5-cent fare basis. Labor in the industry was admittedly, as viewed from facts now known, paid none too well. As has been stated by one public service commissioner, the public wanted a service at a price which demanded cheap labor and it got it.

But be these conditions as they were, debatable though they may be, the facts remain that at the beginning of the economic upheaval caused by the great war the electric railways of the country were operating and giving fair service, in many places wonderful service, for 5 cents. The story of constantly increasing costs in materials, of constant readjustments of labor contracts and of constantly rising costs of operation in general is not new. Nor is it giving any information to repeat the story of the continuous fare increases and adjustments with which every one is familiar in a hazy or general way. But, viewing the history of the whole industry from the knowledge of today, there is one fact that seems certain. As a nationwide average there has been a time lag of fare increases behind increases in operating costs which has caused a deficit to be created, and this deficit is one of the factors to be considered by railways and commissions in adjusting conditions of today and for the future.

But most important to note, from the standpoint of the public at least, and most gratifying to those who would have faith in the future of the industry, is to realize the attitude of those responsible for railway



Zonal Areas or Fare Limits Adopted by Various Cities in Changing Fare Systems

The population, zonal areas and present fare systems of the cities shown here are given at the bottom of the page facing this illustration. The fare history of each is given in the accompanying text.

(These maps are to the same scale as those on page 16) operation in this gradual increase in rates. To the writer's mind, the weighted national average situation shows that the railways have been most moderate in the fare increases requested. It is apparent that the following factors have been in the minds of railway men responsible: That the service must be kept up for the benefit of the public at all costs; that inescapable increases of costs were upon the railways; that whatever fare increases were necessary to meet these increases in costs should be as moderate as possible so that the public, which had to pay the bill, would be burdened as little as possible. As a result, the average situation has shown that the fare advance has been too moderate for the best interests of all; too moderate especially for the best interests of the public, as a matter of fact. To state it in other words, the average railway management has naturally desired to have income overtake outgo, but has made increases in fare barely adequate to make this possible, figured on the most favorable basis, and no sooner has the increase been put into effect than costs have taken another jump and the condition was as bad as before. Then, too, the anticipated falling off in riding has occurred in a greater or less degree, following fare increases. To say this in another way, every one realizes that 100 per cent of the riders will not ride at any increase in fare—some will walk or use other means, private or public, depending upon conditions.

As explained more in detail later on, the result of all this has been a partial, and sometimes complete, disregard of a return to the actual money invested in the various properties through non-payment of interest and dividends. In other words, the owners of the various properties have contributed the physical property itself to a continuous service to the public without any immediate return. It does not pay to refuse, ostrich like, to face the fact that a part of the public—the politicians in the lead—claim that this is only a fair repayment of the traditional excessive profits supposed to have been made by former promoters and owners of traction properties. The industry must make it known that today's owners have made this contribution to the continued service to the public, with a purpose which has been socially patriotic.

Two criticisms might be made of railway managements in this connection.

One of these is that the managements, realizing, as most of them must have done, that at the time of each increase of fare the increase in cost had not ended and that the fare increase would prove insufficient only too soon, have lacked the courage to present their cases for increases that would really be effective. From the standpoint of the public, as is known to be the case now, this would have been the better thing to do, for the railways would have been in a position to extend and develop the service which the public desired and demanded. The other possible criticism is that the railway managements did not have the salesmanship to gain the increases which they knew to be necessary. There is no doubt that the electric railway as an industry has not had a sales attitude, but rather a service and operating attitude.

It is more generous, however, and probably more nearly correct, to believe that the managements have, in each case, felt that they were doing the best thing to keep the fare increase at the lowest possible figure in the hope that the peak had been reached and that the property would be successful under the new rate.

In other industries increases were made by leaps and jumps of from 100 to 250 per cent in case after case. In only a few instances have electric railways taken the full jump at once from the former fare to a fare which was felt to be really adequate and effective.

To make plain the points which have been made above, it is believed worth while to mention the history of a few of the individual experiments which have been made. There have been two general sorts of attempts. One of these has been the gradual increase of flat fares, retaining the old limits, which were usually on the 5-cent basis. The other has been through the application of a distance tariff, under which the passenger pays for the actual distance of the ride, or through a lessening of the distance of the initial fare zone. Most of the latter experiments have been made in New England. The cases which are here quoted are selected at random, so to speak, and merely to show the various kinds and percentages of fare changes which have been made. There is no "typical" case which can be cited. They all differ.

Chicago, Ill.

In Chicago, where the company waited some time for its increase and where the situation was almost as complicated politically as it is in New York, the management did have the courage to ask at the first for a rate of fare which seemed to be fully commensurate with

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DETAILED DATA TO ACCOMPANY ZONAL AREA DIAGRAMS ON PAGE 12

New Haven — Population 162,519*

Fig. 1	Area zone 1	4.66 sq. mi.	Present fare 10c. flat. Fig. 4. Commutation books for suburban riders for trips in 5 suburban zones or more from traffic centers are sold.
	Area zones 1 and 2	12.19 sq. mi.	
	Area zones 1 to 3	22.08 sq. mi.	
	Area zones 1 to 4	31.97 sq. mi.	
Fig. 2	Area zone 1	2.24 sq. mi.	
	Area zones 1 and 2	8.50 sq. mi.	
	Area zones 1 to 3	15.95 sq. mi.	
	Area zones 1 to 4	28.00 sq. mi.	
Fig. 3	Area zone 1	18.13 sq. mi.	
	Area zones 1 and 2	41.43 sq. mi.	
Fig. 4	Area	26.48 sq. mi.	

Brockton—Population 66,138

Fig. 1	Area zone 1	6.81 sq. mi.	Present fare 10c. cash, 14 tickets for $1 (To traffic center only).
	Area zones 1 and 2	18.27 sq. mi.	
Fig. 2	Area	18.27 sq. mi.	
Fig. 3	Area zone 1	6.81 sq. mi.	
	Area zones 1 and 2	18.27 sq. mi.	
Fig. 4	Area zone 1	18.27 sq. mi.	

Worcester — Population 179,754

Fig. 1	Area	39.54 sq. mi.	Present fare 7c. in city zone and 6c. in outside zones.
Fig. 2	Area zone 1	36.92 sq. mi.	
	Area zones 1 and 2	72.65 sq. mi.	

Providence — Population 237,595

Fig. 1	Area	44.00 sq. mi.	Present fare 6c. in each zone.
Fig. 2	Area	17.94 sq. mi.	
Fig. 3	Area zone 1	12.87 sq. mi.	
	Area zones 1 and 2	44.50 sq. mi.	

San Diego — Population 74,683

Fig. 1	Area zone 1	1.65 sq. mi.	5c. in each zone, 4 tickets for 30c., good in two zones.
	Area zones 1 and 2	12.50 sq. mi.	

Springfield — Population 129,563

Fig. 1	Area	58.71 sq. mi.	Present fare 7c. in each zone.
Fig. 2	Area zone 1	15.87 sq. mi.	
	Area zones 1 and 2	62.15 sq. mi.	

Newark — Population 414,216

Fig. 1	Area zone 1	2.38 sq. mi.	Present fare 7c. flat, 1c. transfer charge.
	Area zones 1 and 2	8.55 sq. mi.	
	Area zones 1 and 3	22.20 sq. mi.	
	Area zones 1 and 4	31.00 sq. mi.	
Fig. 2	Area	59.00 sq. mi.	

Milwaukee — Population 457,147

Milwaukee and vicinity:			Present fare 7c. in zone 1, 8 tickets for 50c., 3c. in outer zones.
	Area zone 1	26.00 sq. mi.	
	Area zones 1 and 2	42.00 sq. mi.	
	Area zones 1 and 3	62.00 sq. mi.	
Milwaukee alone:			
	Area	25.40 sq. mi.	

Portland — Population 69,272

Fig. 1	Area zone 1	17.00 sq. mi.	Present fare 10c. cash or 8c. ticket, for ride through 3 zones or less.
	Area zones 1 and 2	49.98 sq. mi.	
Fig. 2	Area zone 1	15.23 sq. mi.	
	Area zones 1 and 2	32.32 sq. mi.	
Fig. 3	Area zone 1	4.19 sq. mi.	
	Area zones 1 and 2	15.91 sq. mi.	
	Area zones 1 and 3	26.62 sq. mi.	
	Area zones 1 and 4	49.94 sq. mi.	

*Population figures are from the 1920 census report.

cost. This was later cut down by the commission, but soon increased to the present fare of 8 cents on the surface lines. The rapid transit, or elevated, lines have another story to tell, but they have finally arrived at 10 cents, with a ticket rate of four for 35 cents. The following tables show the changes made in Chicago:

CHICAGO SURFACE LINES

Date in Effect	Cash Fare, Cents	Ticket Fare, Cents	Children's Fare, Cents
	5	....	.
Aug. 7, 1919	7	Ten for 65 or Fifty for $3.00	4
Dec. 27, 1919	6	None	3
July 1, 1920	8	None	4

CHICAGO ELEVATED LINES

Date in Effect	Cash Fare, Cents	Ticket Fare, Cents
	5	....
Nov. 21, 1918	6	....
Aug. 7, 1919	8	....
Feb. 1, 1920	8	Two for 15
Aug. 4, 1920	10	Four for 35

Cincinnati, Ohio

Perhaps the most exaggerated example of the moderate fare changes, as costs go up and down, is found in Cincinnati, where the people and the company have agreed on a service-at-cost basis of operation. In a way it is typical of the point which it is desired to make. Without criticising the conditions of the contract, the facts may be stated that a slight increase in fare is allowed at the end of a three-month trial of one fare system, if that one has not paid enough to keep a certain check fund up to a specified amount. On this basis Cincinnati started its service-at-cost operation in August, 1918, with a cash fare of 5 cents and a ticket rate of five for 25 cents. Since then the following table tells the story of fare changes in Cincinnati:

Date in Effect	Adults		Children Under Ten Years	
	Cash Fare, Cents	Ticket Fare, Cents	Cash Fare, Cents	Ticket Fare, Cents
1896 to Dec. 31, 1918	5	Five for 25	3	Two for 5
Jan. 1, 1919	6	Six for 33	3	Four for 11
Apr. 1, 1919	6	Five for 30	3	None
July 1, 1919	7	Six for 39	4	Four for 13
Oct. 1, 1919	7	Seven for 35	4	Four for 13
June 1, 1920	8	Two for 15	4	Four for 13
Sept. 1, 1920	8	Five for 40	4	Five for 20
Dec. 1, 1920	9	Two for 17 or Six for 51		

It is most important to point out, in connection with the Cincinnati experience, that one of the efforts made to keep the cost of service from going up was that the Director of Street Railways, W. C. Culkins, ordered the local company to reduce the service.

New Orleans, La.

In October, 1918, as the result of the War Labor Board's increase in wages the 5-cent flat fare was increased to 6 cents, and again on Oct. 21, 1920, fares were increased, this time to 8 cents as the result of further wage advances to the employees.

Cleveland, Ohio

Cleveland is the first "service-at-cost" city and since the adoption of the Tayler plan in 1910 there have been various fare changes. Some one remarked recently that the Cleveland public continued to ride in as great numbers at high fares as at low fares and the rejoinder was that "the Cleveland public is trained to railway service the same way that it is trained to general merchandise purchasing; it is merely in the habit of getting on the car and asking the conductor 'how much.'" Since the Tayler plan was inaugurated fare changes as indicated in the accompanying table have taken place:

Date in Effect	Adult		Net Transfer Charge, Cents
	Cash Fare, Cents	Ticket Fare, Cents	
March 1, 1910	3	Five for 15	1
June 1, 1911	3	Five for 15	None
Sept. 1, 1914	3	Five for 15	1
Dec. 15, 1917	4	Three for 10	None
Dec. 26, 1917	4	Three for 10	1
April 3, 1918	4	Seven for 25	None
April 10, 1918	4	Seven for 25	1
Aug. 4, 1918	5	Seven for 25	1
July 5, 1919	5	Eleven for 50	1
Dec. 15, 1919	5	Six for 25	1
May 10, 1920	5	Five for 25	1
Nov. 14, 1920	6	Nine for 50	1

Boston, Mass.

Boston, Mass., as is well known, is now operated under a board of trustees representing the state. Since attempts have been made to meet rising costs by increasing fares the following changes have been made:

Date in Effect	Cash Fare, Cents	School Ticket, Cents	Exchange Ticket in Chelsea with Bay State, Cents
	5	None	3
Aug. 1, 1918	7	None	None
Dec. 1, 1918	8	None	None
Jan. 1, 1919	8	Ten for 50	None
July 10, 1919	10	Ten for 50	None

Washington, D. C.

Washington, D. C., presents an unusual case, in that there are two competitive companies, with entirely different systems. In order to protect the service of each of the two independent companies they have had to be considered together in adjustment of fares. Starting with a 5-cent cash fare, with six tickets for 25 cents, increases have been made as shown herewith:

Date in Effect	Cash Fare, Cents	Ticket Fare, Cents	Company Transfer Charge, Cents	Net Transfer Charges Inter-Company Transfers
	5	Six for 25	Nothing	No transfers
Nov. 1, 1918	5	None	Nothing	No transfers
Jan. 15, 1919	5	None	Nothing	Free Inter-Company transfers at thirteen points
June 1, 1919	5	....	2	Free
Nov. 1, 1919	7	Four for 25	Nothing	Inter-Company transfers, 2 cents
Dec. 13, 1919	7	Four for 25	Nothing	Abolished
May 1, 1920	8	Four for 30	Nothing	2 cents

Philadelphia, Pa.

Philadelphia is another example of fare increase, which has its own characteristics. Starting with a 5-cent fare, to which was added a 3-cent exchange ticket, or transfer for many of the transfer passengers, the management has held to the theory of a basic 5-cent fare even up to the present. The same story of increasing costs has to be told there too. These were met in Philadelphia by a great increase in riding and by the same devotion of the property or capital to the service of the public without adequate return. But finally even Philadelphia conditions could no longer allow continued operation without fare increase—the last wage increase which had been awarded to the men had to go unpaid—and various schemes were put forth. The management desired a 5-cent fare with no transfers, which would have been one sort of experiment; the Public Service Commission decided that this would be discriminatory against many riders and ordered the company to put into force, temporarily, as another experiment, a 7-cent rate with four tickets for 25 cents where the former 5-cent rate had been in effect, and to continue to sell the 3-cent exchange tickets as usual.

Portland, Ore.

On June 15, 1918, the former 5-cent fare, with free transfers, was changed to 6 cents cash with tickets in lots of five for 30 cents and fifty for $2.75. Transfers between city and interurban cars were eliminated in December, 1918. On June 15, 1920, the cash fare was raised to 8 cents and all reduced rate tickets abolished.

In order to present more graphically, and possibly more forcibly, the condition of many of the flat fare cities at the present stage of the development there are shown in accompanying illustrations outline maps of several of these cities, with information to show the area served for the flat fare, the population of the corporate city according to the 1920 census figures, and the fare system in force. These maps are all shown to the same scale in order to make the graphic illustration as forceful as possible. These were first published in the ELECTRIC RAILWAY JOURNAL Aug. 5, 1916, accompanying an article by D. J. McGrath, and were later published in "Street Railway Fares," Jackson and McGrath.

The Connecticut Company

Of the other type of fare experiments which have been made, namely, the distance-tariff schemes, the writer's own company, the Connecticut Company, is one example. It is also an example of flat fare changes, both before and after the zone system experiments. Starting with a 5-cent fare, the first change was made in October, 1917, when a rate of 6 cents was established on the old 5-cent limits. By 1919 this was proving to be inadequate and, to avoid any increase on the initial fare, the fare for the short distance rider, a zone system was devised in which zones were laid out of from 1.5 miles at and near urban centers to 0.8 miles in suburban and interurban territory. Taking New Haven as a typical city under this system, there is shown in an accompanying diagram the outline maps of the various zones under this system, which was installed Nov. 2, 1919. In fact, the various schemes are shown in a series of maps. Fig. 4 shows the former 5- and 6-cent city areas. Fig. 2 shows the zones with their areas under the first zone system. Under the first zone system the minimum and initial fare was 6 cents, for which a passenger could ride two zones or less. An additional charge of 2 cents per zone was made after the first two zones. Seventeen 6-cent zone tickets were sold for a dollar. Transfers were issued to allow any passenger to continue his ride for the same charge as if he had stayed on the original car. The traffic center was a zone dividing point in both the first and second zone schemes. As has already been related by the ELECTRIC RAILWAY JOURNAL, this system allowed some increase in revenue, enough to pay operating expenses and some fixed charges, but not all, by any means. It was later modified by what the Connecticut commission hoped would prove to be an improvement. Fig. 2 shows New Haven under the equal-length zone system installed by the commission on May 9, 1920. Under this zone system the cash fare was 3 cents per zone, with a minimum fare of 6 cents. A fifty-zone ticket was sold for $1, the minimum amount punched in this case being three zones, or 6 cents. There was also a calendar month commutation ticket sold at 1.75 cents per zone for suburban riders traveling five zones or more from the traffic centers of certain sized cities. These commutation tickets were non-transferable and were not good on Sundays and holidays. Under this system, also, transfers were issued to allow any passenger to continue his ride for the same charge as if he had stayed on the original car. This experiment did not provide as much revenue, comparatively, as the first zone system and was abandoned on Aug. 8, 1920, for a fourth change, from the old 5-cent system, as shown in Fig. 3. In this case a smaller area than the old 5-cent area was put on a 7-cent basis and a 6-cent area about 2 miles long placed outside of this. Suburban lines were put on a basis of 6 cents for 2-mile zones. This presented difficulties in two ways—it neither provided the necessary revenue nor was satisfactory to the public. Finally, on Nov. 1, 1920, a return was made to the old 5-cent areas with a 10-cent fare and commutation tickets under same conditions as before at 2½ cents per mile. Its effect cannot yet be correctly analyzed, for it has been in effect but two months, months that have suffered the general industrial depression. It is only fair to state, however, that from the standpoint of company revenue this system seems to be proving satisfactory. As compared with the corresponding periods of previous years, the increase in fare has not proved so objectionable to the public as might have been anticipated, for the number of passengers carried has decreased but slightly. Estimates in Connecticut are complicated by the jitney problem.

Milwaukee, Wis.

Milwaukee has the distinction of establishing in 1914 the first central area zone system with zones outside of the central area having a zone rate of less than 5 cents.

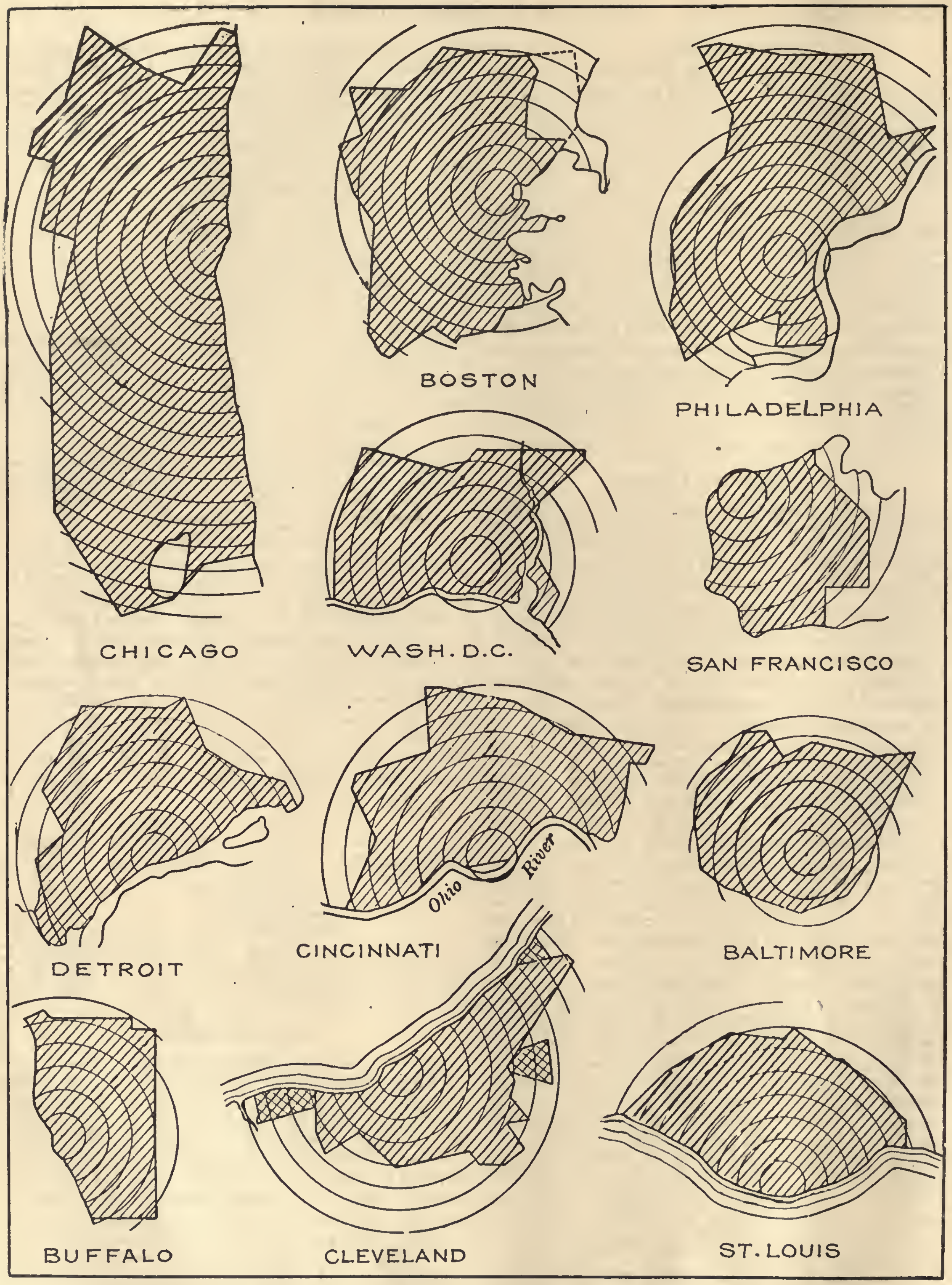
In December, 1913, the unit cash fare for a ride was 5 cents, with twelve tickets for 50 cents, and with free transfers within the one-fare area of Milwaukee, which corresponded approximately to the city limits. On Jan. 18, 1914, a central area zone system was made effective. The limits established at that time are in effect today, although changes have been made in the base fares both in the central area and in the interurban zones. These changes are shown in the following table:

	Central Area		Suburban and Interurban Zones			
Date Effective	Cash Fare, Cents	Ticket Fare, Cents	Cash Fare, Cents	Min. Fare, Cents	No. of Zones	Suburban Ticket Rate, Cents
Jan. 18, 1914...	5	Six for 25, twelve for 50, twenty-five for $1	2	5	2	....
Nov. 19, 1914...	5	Six for 25, twelve for 50. twenty-fiva for $1	2½	5	2	Thirty for 50
Jan. 30, 1915...	5	Six for 25, twelve for 50, twenty-five for $1	2½	5	2	Thirty for 50
June, 1918...	5	None	2½	5	2	Thirty for 50
July 3, 1918...	5	None	5	6	2	Thirty for 60
Nov. 2, 1919...	7	Six for 35 or 18 for $1	3	6	2	Twenty for 60
Feb. 3, 1920...	7	Six for 35 or nine for 50	3	6	2	Twenty for 60
June 7, 1920...	7	Eight for 50	3	6	2	Twenty for 60

Brockton, Mass.

Brockton, Mass., is taken as a typical illustration of the zone system of fares established on the Bay State System. Prior to October, 1917, there was a central area with 5 cents as the unit of fare and with free transfers. On lines extending beyond the central area boundary additional 5-cent zones existed. There were likewise overlaps from the center of the city area and extended transfer privileges and reduced rate tickets at varying rates. On Oct. 15, 1917, the rate of fare in the suburban and interurban zones was increased to 6 cents.

On June 24, 1918, an entirely new zone system (Brockton, Fig. 1) was established. This plan called for a central city zone in which the unit rate of fare was 6 cents cash with free universal transfers, and outlying zones having a base rate of 2 cents each and a minimum fare of 6 cents for three zones or less. Several forms of reduced rate tickets were sold—namely, six for 30 cents



Diagrams Showing Relative Areas of Several Cities Which Operate on a Flat Fare Base

The population and present fare status of the cities shown here are given at the bottom of the page facing this illustration. The concentric circles on these maps are at mile intervals

(These maps are to the same scale as those on page 12.)

and six for 25 cents from the limits of the central zone to the traffic center, without transfer privilege. The latter form of ticket was for off peak travel and good only from 9 a.m. to 4 p.m. Mondays to Fridays inclusive, while the six for 30 cents tickets were good at all times. Two additional tickets of similar nature were sold from points in the first outer zone to the traffic center, namely, seven for 50 cents and four for 25 cents.

On Jan. 8, 1919, the above described central zone was abolished as such and the entire area of the first outside zone included in the central city zone area. (See Brockton, Fig. 2.) In the interurban territory two of the former 2-cent mileage zones were combined and the base rate per zone was made 5 cents. The unit fare, however, either in the central area or the interurban zones, was 10 cents cash, or reduced rate tickets good for a single zone ride were sold in lots of five for 35 cents. On July 1, 1919, the five for 35 cents reduced rate ticket was abolished. On Nov. 23, 1919, a new ticket rate was established from the limits of the central area to the traffic center. These tickets were sold in lots of sixteen for $1 and carried no transfer privileges whatever.

On Sept. 15, 1920, all free transfers were withdrawn, making the 10-cent cash fare good only to the traffic center. At the same time the reduced rate ticket was increased to fourteen for $1 and new outer limits established at what was practically the former 6-cent city area. (See Brockton, Fig. 3.) On Dec. 1, 1920, the ticket limits were again extended to the limits of the 10-cent city zone. (See Fig. 4.)

Portland, Me.

In Portland, Me., prior to Aug. 1, 1918, the fare limits consisted of a number of 5-cent zones of various lengths with a number of overlaps. (See Portland, Fig. 1.)

On Aug. 2, 1918, the Portland Railroad, with the approval of the Maine Public Utilities Commission, established the initial zone system having a central area varying in radius from 3 to 4.5 miles from the central point of the city. Outside of this area was a series of zones varying in length from 1 to 3 miles. The fare in the central zone was 6 cents with free transfers except on three lines which operated entirely within the central zone and through the business or short-haul territory. On these the unit rate of fare was 5 cents with a 1 cent charge for a transfer. The rate of fare in the outside "copper" zones was 2 cents for short zones and 4 cents for zones about 2 miles in length with a minimum of 6 cents. (See Portland, Fig. 2.)

On March 2, 1919, the former inner zone was divided into three fare zones, making the unit rate of fare per zone 2 cents with tickets or 3 cents if paid in cash, with a minimum cash fare of 10 cents or 6 cents with tickets for three zones or less. Tickets were sold in lots of fifteen for 30 cents. Passengers paying cash were entitled to rebate checks equal to the difference between the cash fare and the ticket fare, which were redeemable at reasonably convenient points but not later than the close of the day following date of issue.

Effective June 15, 1919, without change in zone limits the 6 cents with ticket or 10 cents cash fares with rebate were changed to 7 cents with ticket and 9 cents cash without rebate. On Aug. 1, 1920, the rates were further increased to 8 cents with ticket or 10 cents cash.

Providence, R. I.

In Providence the Rhode Island Company on May 5, 1918, established a zone system with a 5-cent central area and with 2-cent mile zones outside. (See Providence, Fig. 2.) This zone system proved inadequate as a revenue producer and was difficult of collection inasmuch as it was necessary to use duplex or tear checks.)

On Oct. 23, 1918, the system was revised with 5-cent zones (see Providence, Fig. 3) and for collection purposes the Rooke register was again put into use. This plan proved to have a greater earning capacity and if it had not been that the increase in cost of service outstripped the gain in revenue this scheme would in all probability have been in effect today, but due to the need of greater revenues the fare in each zone was changed on Sept. 28, 1919, to 6 cents.

Springfield, Mass.

Another city that has tried a zone system with a central area is Springfield, Mass. Prior to May 1, 1918, a uniform fare of 5 cents with free transfers was in effect. (See Springfield, Fig. 1.)

On May 1, 1918, the first zone system was established. (See Springfield, Fig. 2.) Under this plan the unit rate of fare was 5 cents in the inner and first outer zone. The inner zone had an average radius of about 2.5 miles, while the distance across the first outside zone varied from 2 to 4.2 miles. There were two classes of reduced rate tickets: one, from any point in the Springfield inner zone to a point five miles out, sold in lots of six for 40 cents; the second was six tickets for 50 cents which were good between points in the inner and first outer zone. In the Westfield division outside of the Springfield city limits the rate of fare was 2 cents per mile, except in Westfield, where the minimum fare was 6 cents.

On Sept. 16, 1918, the cash fare in the two Springfield zones was increased to 6 cents. The six tickets for 40 cents were increased to 45 cents and the six tickets for 50 cents increased to seven for 65 cents. In the Westfield division the zone rate was increased to 2.5 cents per mile but no change was made in the zone locations or the minimum fare in Westfield.

On Oct. 19, 1919, the present rates of fare were established. This change made the fare 7 cents in each of the two Springfield zones. The former six for 45 cents tickets were increased to eleven for $1 and the seven for 65 cents to nine for $1.

In the Westfield division the mileage zone rate was increased to 3 cents with a 7-cent minimum fare or ten tickets for 65 cents. The mileage zones on the Palmer division were rearranged by making one zone out of each two adjacent zones and the rate of fare was increased to 7 cents per zone.

DETAILED DATA TO ACCOMPANY FLAT FARE CITY AREAS ON PAGE 16

CLEVELAND, OHIO
Pop.—769,836*
Area—46 sq.mi.
Fare—6c., 9 tickets for 50c.

ST. LOUIS, MO.
Pop.—772,897.
Area—56 sq.mi.
Fare—7c. flat.

CINCINNATI, OHIO
Pop.—401,247.
Area—58 sq.mi.
Fare—9c., six tickets 51c.
Two tickets 17c.

CHICAGO, ILL.
Pop.—2,701,705.
Area—182 sq.mi.
Fare—Surface line 8c. flat.
Elevated 10c., four tickets 35c.

PHILADELPHIA, PA.
Pop.—1,823,158.
Area—91 sq.mi.
Fare—7c., four tickets 25c.
3c. transfers at many points.

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*Population figures are from the 1920 census report.

BUFFALO, N. Y.
Pop.—506,775.
Area—38 sq.mi.
Fare—7c., four tickets 25c.

SAN FRANCISCO, CAL.
Pop.—508,410.
Area—40 sq.mi.
Fare—5c. flat.

BOSTON, MASS.
Pop.—748,060.
Area—81 sq.mi.
Fare—10c. flat.

DETROIT, MICH.
Pop.—993,739.
Area—58 sq.mi.
Fare—6c., nine tickets 50c.

BALTIMORE, MD.
Pop.—733,826.
Area—50 sq.mi.
Fare—7c. flat.

WASHINGTON, D. C.
Pop.—437,571.
Area—48 sq.mi.
Fare—8c., four tickets 30c.

Worcester, Mass.

The Worcester (Mass.) Consolidated Street Railway, operating in Worcester and vicinity, had prior to July 1, 1918, a central area 5-cent zone system with the suburban and interurban zones of varying lengths. (See Worcester, Fig. 1.) Many overlaps also were in effect both from urban points to interurban points and in the interurban zones.

On July 1, 1918, the rate of fare in all zones outside of the urban central zone was changed to 6 cents. On Aug. 1 of the same year the unit rate of fare in the Worcester urban area was also made 6 cents. The third change was made on April 18, 1919, when the unit rate of fare in each zone, city and interurban, was changed to 7 cents with ten tickets for 65 cents and 33⅓ per cent increase in all reduced rate tickets. No alteration in the length of zones was made in any of these fare changes.

On Nov. 30, 1919, the system was rezoned (see Worcester, Fig. 2) and the unit rate of fare reduced to 5 cents per zone, with a traffic center established at Worcester City Hall. All reduced rate tickets except pupils' tickets were abolished as well as free transfers in the Worcester urban territory.

On Jan. 4, 1920, the unit rate of fare within the Worcester city limits was increased from 5 to 6 cents, with no change in zone limits or rate of fare on outside lines. On March 7, 1920, a further increase to the present rates of fare was made. This made the unit rate of fare within Worcester city limits 7 cents per zone and 6 cents in the outside zones.

Public Service Railway, Newark, N. J.

Another example of a zone system tried and abandoned is that of the Public Service Railway of New Jersey. An even more drastic zone system was put into effect there (Sept. 14, 1919), as indicated by the accompanying analytical maps of Newark, which may be considered typical. The first of these shows the former and present flat fare areas. Before trying a zone system the Public Service Railway had first added a 1-cent transfer charge to the 5-cent fare and later changed to a 7-cent fare with a 1-cent transfer, which rate was lowered for a time to 6 cents and 1 cent for transfer, but almost immediately returned to 7 cents with 1-cent transfer.

The zone map shown there is not exactly correct, except when considered from the standpoint of the traffic center. This method of drawing the map was the only one practicable, however, for it does give some comparison with the other places where zone systems have been tried. In this case each line, no matter what its source or route, without relation to any traffic center, was laid off in equal length zones and a straight distance tariff put into effect. The charge per zone was 2 cents, except that the charge for the first zone was 3 cents; no transfers were issued, but "continuous trip" checks were issued in some cases. On Nov. 15, 1919, the so-called "five and one" plan proposed by the Public Utilities Commission superseded the "three and two" plan. Under the new plan the rates were 5 cents for the initial ride on any car, which, however, entitled the passenger to ride two zones or less, with 1 cent for each additional zone ridden. A charge of 1 cent was made for a transfer to obviate the necessity for a passenger to pay the initial 5 cents on the line to which he transferred. The system finally proved ineffective, however, for reasons hard to analyze. The complete story of this and most of the other attempts being reviewed here have already been told by the ELECTRIC RAILWAY JOURNAL and will not be repeated except in review. Suffice it to say that the next step was to return (Dec. 7, 1919,) to the flat rate of fare, which is 7 cents, with a 1-cent transfer, the same that was in effect previous to the inauguration of the "three and two" system.

San Diego, Cal.

In San Diego a two-zone system with a 5-cent fare in each zone became effective on Jan. 1, 1920, superseding a 5-cent flat fare with free transfers. By this plan the city is divided into an inner and outer zone and the cash fare for a ride from the outer zone to any point in the inner zone or, in fact, across the inner zone to a point on the opposite side of the city in the outer zone, becomes 10 cents. Free transfer privileges are retained to connecting lines in either the inner or outer zones. Reduced rate tickets are sold in lots of four for 30 cents and monthly tickets good for purchaser only at the rate of 6.5 cents per ride. These tickets bear the same transfer privilege as cash fares.

From the review of fares, thus analyzed by the cities chosen, it appears that there is no known method of assessing fares upon the riding public that has not been tried in this national experiment. Some methods never heard of before have also been tried, as is evident.

Although it involves, possibly, a repetition of some statements earlier in this article, it should be pointed out that there is definite and conclusive showing that the managers of the various properties have done everything in their power to keep the cost of service to the car rider down absolutely to the lowest minimum possible; this in an effort not only to benefit the community by a low rate of fare but hopefully in regard to a continued use of the cars by low base rate. It should also be repeated that these fares have failed, at least in the earlier stages, to catch up with the increasing costs. This review also indicates, therefore, as was stated in another way earlier in the article, that the courageous and proper thing for the managements to have done would have been, early in the stage of increasing costs, to have placed the rate of fare at a high enough point to cover all these increases and to have recognized the fact that a declining number of passengers might be expected with radical increases in individual rates. Had this been done there is no question but that the industry would have benefited and the communities themselves would have been better served by thoroughly maintained properties, properties which would expand better to meet the needs of the communities than has been the case with this cautious effort to increase the revenues.

As to the future, he would indeed be an optimist who would predict the outcome. Some years ago the managers of properties might have been sufficiently optimistic to try this prediction, but in view of the past condition and the continuing need for increasing and ever increasing the gross income to meet payrolls, which are still advancing, no management would at the present time hazard an estimate of what the future may develop. It is doubtless true that costs will no longer advance and relatively few increases in rates from the present standard will be needed except such as are necessary to produce an income in excess of operating costs to meet the actual necessary return to the owners of the property.

It is also true that there is another aspect to this problem in respect to future reduction in rates. Due to the history of the industry as related above there has been created a deficiency in earnings in all cases, and an actual inroad into capital in many others, which the various properties have suffered in the past six years. There has been an accumulated deficit and a decrease in maintenance which must be met and the property brought to a high standard of maintenance and credit before it will be possible seriously to consider any rate reduction whatever. That this fact is already recognized by the public as represented by the public service commissions has been indicated in the recent decision of the Public Utilities Commission of Tennessee on the application of the Nashville Gas & Heating Company for increased rates, decided Nov. 30, 1920.* In this case the commission found that the company had suffered a deficiency in earnings and an impairment of maintenance due to inadequate rates. It determined this deficiency in earnings to be $118,000 and authorized the company to charge such rates as would be necessary to make the necessary return upon capital at present, which was set at from 6½ to 7½ per cent, and also to amortize this deficiency at the rate of $1,000 per month. The company was further authorized and ordered to "reinforce its service in the outlying residential districts . . . with its first available earnings over and above the 6½ per cent on the investment and the amount hereinbefore set out with which to amortize its losses since July 1, 1919, and that the company shall not pay dividends on any of its stock until this work be completed." It appears that this attitude is an appreciation of one of the points which this article has intended to emphasize, namely, that the utilities, and certainly the electric railways, have conscientiously continued to give the best possible service to the public, generally at rates which have failed to pay the full cost, and that consequently there has accumulated a deficit which must be made up before the railways can again be of greatest service to the communities and certainly before it will be possible to consider rate reductions.

It is incumbent upon the managers of the industry to impress upon the public the fact that undue caution has been the fundamental basis of all the rate advances in the past, and it is hoped that this contribution to the problem will assist in impressing upon the public the fact that none of the efforts to increase rates has at any time shown a sufficiently courageous attitude by the men charged with developing the service and sustaining the property and the corporation producing the service.

Another purpose of this article has been to show the experimental nature of the various fare changes that have taken place. It appears that this experiment has not ended. Where the industry is going as to fare systems and fare policies is also difficult to predict. It has been said that the trend is toward 10 cents. There is, of course, much to support this view, if a curve of fare changes is plotted, perhaps. But it appears that the industry can well consider the facts as they exist today. These facts, it appears, are that the public has been educated by the industry and by its own investigations into the matter to believe that costs of furnishing electric railway service differ in various cities in different parts of the country under the varying conditions which exist in these cities. Public opinion, density of population, riding habit, topography, living costs and the numerous other items which the industry has often talked of must be taken into consideration, and the public knows this. It is therefore very doubtful if any given fare, such as the former five cents, ever becomes so universally applicable as was that charge. Whether zone systems will prove practicable in the United States is not yet known. It is certain, however, that the final standardization of fare system for any community can be arrived at only after an intermediate period, during which the rate of fare shall be high enough to absorb the accumulated deficits of the past few years.

One conclusion which can be drawn from the experiment seems to be that the railways are in the habit of studying the matter in detail and that there is hope of arriving at a system of fares in America which will ultimately pay for the service, prove satisfactory to the riding public and allow the properties to grow to supply the transportation needs of the communities.

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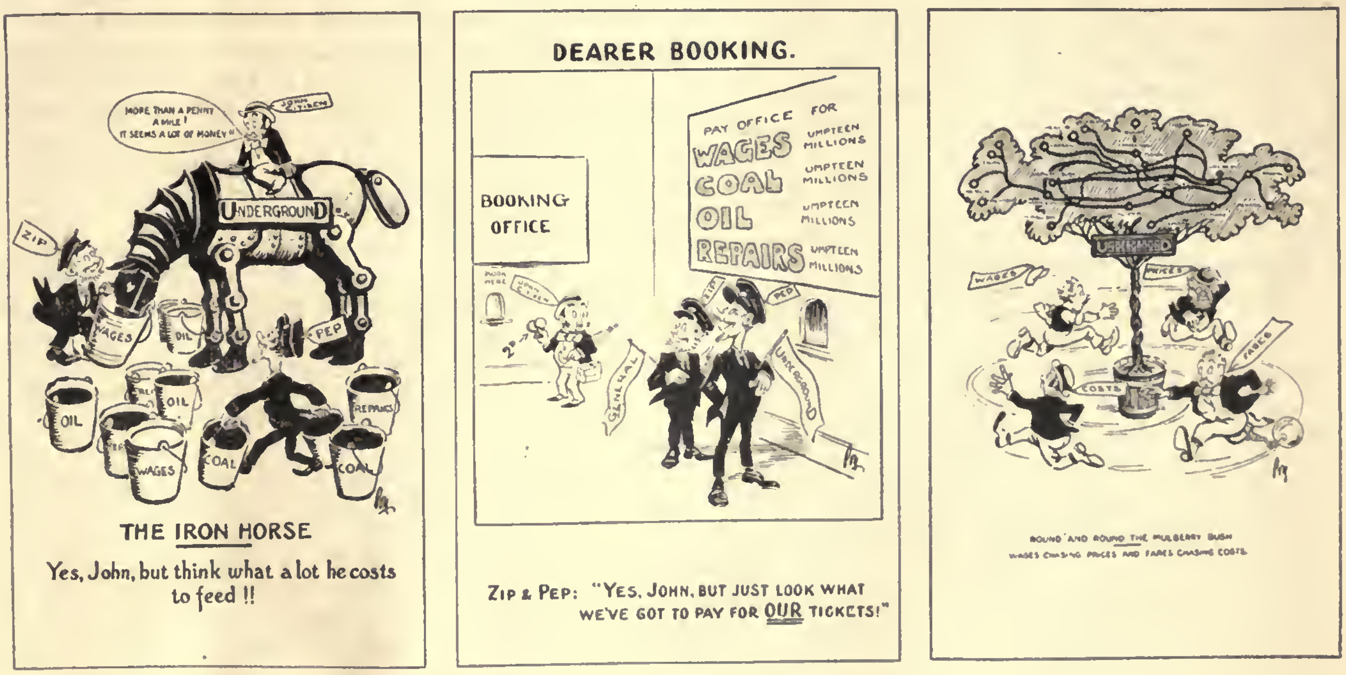
*This decision is reviewed on page 63, this issue.—Eds.



THE IRON HORSE

Yes, John, but think what a lot he costs to feed !!

Zip & Pep: "Yes, John, but just look what we've got to pay for OUR tickets!"

Round and round the mulberry bush
Wages chasing prices and fares chasing costs

THE BRITISH ALSO HAVE HAD FARE TROUBLES

The London Underground thus tells the story to the public

When We Build Our Tracks

The Track Is the Vital Part of a Railway—Some of the Details Which Should Have Consideration in Connection with Track Construction Are Discussed—Some "Don'ts" Are Suggested for Study When Track Designs Are Being Prepared

By R. C. Cram

Engineer Surface Roadway Brooklyn Rapid Transit Company, Brooklyn, N. Y.

THE Federal Electric Railways Commission recently handed down a report emphasizing the fact that the electric railway is an essential utility which is and has been of great service in the development not only of the cities but also of the country as a whole. It is very desirable that the railways themselves shall fully realize the importance of the word "rail-way," because we are apt to forget that the rail is an essential part of the track and that the track is the fundamental part of the railway. The Public Utilities Commission of Connecticut made the following pointed statement in a recent decision: "From an analysis of the history and development of street railways the commission is led to the conclusion that even though the motive power may change, as it has in the past, the essential features of a street *rail* way will remain. For more than seventy-five years street railways have operated along a predetermined course, on *rails* or *tracks*, with every new form of motive power." (There is a temptation at this point to turn aside and comment upon the situation which has largely resulted from operation at a predetermined rate of fare since the fare question is behind most of our present track troubles.)

FIRST, WE MUST DECIDE WHETHER ALL OF OUR TRACK IS WORTH WHILE

No one except a jitney devotee will question the fact that the tracks are needed, but before we undertake to overcome the handicaps which have prevented adequate track reconstruction programs we should determine whether we really need all the trackage which we now have. There are many systems which are consolidations of lines which were formerly in competition and it has required a war condition to render evident the over-tracked state which may be found in numerous instances. Diminishing revenue revealed a number of situations where lines closely paralleling one another were not paying. They would have been seen not to have paid their keep if they had been operated as separate units instead of parts of a large system.

Consequently the beginning of the era of reconstruction and rehabilitation which is about to open should find us engaged in a study of our maps, population and riding statistics, and all the other aids incident to the process of reaching a decision as to what trackage should be definitely abandoned, sold as junk and written off the books. The tendency to hang on to unprofitable lines must first be overcome if we are to consider our industry as being subject to the same economic laws as those which control other industries. We should bear in mind that our paving obligations alone have reached such proportions that they may be large enough in some cases to turn a line from an asset into a liability. Incidentally a study should also be made of the gains which may be made by rerouting of lines which will naturally follow any curtailment in track facilities. We have ample evidence that re-routing has often been a great aid in speeding up traffic and in increasing business.

TRACK WORK IS FIVE YEARS BEHIND SCHEDULE

It is everywhere apparent that the reconstruction and the rehabilitation of tracks have been held back by the general lack of adequate revenue which has prevailed during and since the war. Little new construction was going forward in the years immediately preceding the war and, aside from war trackage, very little new mileage has been built for several years past. It is needless here to state the causes for the lack of revenue, but the "no funds" condition always puts a stop to expansion of electric railway facilities and leads to radical curtailments in reconstruction and maintenance programs. With such conditions prevailing over a long period the way engineers have been forced to devote their efforts toward keeping up tracks which in normal times would be considered as fit only for the scrap pile.

In track work it has not been so much a question of the degree of maintenance, but rather one of any maintenance whatever. With labor at a premium; with material costs high and going higher, the problem has been that of finding the means to do the patch-plus-a-patch sort of work to which most systems have been reduced. When a reasonable amount of track is not reconstructed yearly the general standard of track condition lowers perceptibly, and second-hand rail and ties which might be used in further patch-work become as scarce as new materials. Some of us have even been forced to take up tracks to secure materials for repairs in other quarters.

Most electric railways are at least five years behind in their renewal or reconstruction programs, and tracks all over the country are in a general state of disrepair which is costly in rolling stock maintenance, in power consumption and in slow schedules. Fortunately there seems to be a rift in the clouds of financial depression which have so long hung over the industry and increased revenues have resulted from the fare increases granted by a reluctant or indifferent public. While a large part of these increases is consumed in increased pay-rolls and fuel costs, it seems that there should be some part of the added funds which can be devoted to the track and it should be remembered that the track is a vital part of the railway. Without the track, we cannot run cars. With poor track we cannot run cars safely and economically. If there be any money available, it is safe then to assume that a company will spend as much as possible this year upon the track and will start the work as soon as the frost is out of the ground rather than sometime after June 30. Let the calendar year begin to control the track expenditure as one means of lessening the cost of the work.

Perhaps the opportunity for an ideal rehabilitation such as Chicago developed in 1908 may not be present, but we can apply some of the Chicago methods of attack and adjust our plans to our present-day needs. With this in mind our first duty is to make a careful survey of the several types of track found on the system with the view of determining age, car traffic and general condition. From this we may make up a table or budget indicating where we should rebuild and where we should overhaul. The data in the table should be grouped to indicate the desirable order of work not only for the current year but also for several years in advance, as it will be almost impossible to overcome a five-year handicap within any one season. It goes without saying that such tables should also show estimated costs for each item, with group totals. Most estimates of this character are also required to show the division of the expense between the capital and maintenance accounts.

Another table or group of tables containing the same items of work but made to show the quantities of rails, ties, joints and paving materials will also be found very helpful in case the program should be adopted. It is usually unwise to make them up before the adoption of a program, since managements have a habit of changing and rearranging almost any schedule submitted.

In making studies for budgets of this sort it may be advisable to set aside some of our prevailing notions that we know all about our track systems and to make an analysis of the several types of track in service. Sketches should be made of these and designated by type numbers or letters. The percentage of each type in use should be determined. The tracks should be dug up in spots occasionally and the condition of the ties, rail bases and rail fastenings studied. An attempt should be made to compare the relative lives of the different types in the light of traffic conditions. Sometimes it may be found that older types of track are giving better service than some of the more modern types. Such a condition, if found, should be the basis for a search into the causes. Having determined upon the latter, the obvious step is to apply ourselves to the modifications in design which will remedy the conditions.

THINGS TO AVOID IN TRACK REHABILITATION

In connection with the preparation of track designs some "don'ts" may be in order. Do not play too hard at the game of "follow the leader." It is all very well to follow standards, but it does not always pay to assume that some particular track construction standard as developed on one system will be suitable on some other system. Do not forget that our association standards represent the best thought and a wide experience, and that they can be followed with assurance of their worth, if properly selected and correctly applied. Incidentally a study of the way committee reports on proper foundation for tracks in paved streets, to be found in the 1914 and 1915 Proceedings, will be of assistance in rounding up all the factors which should have attention when track designs are under discussion.

Do not expect to get something for nothing. We cannot afford to build too lightly in an effort at cheapness by reducing first cost. We must consider that a track should have a long life. A life of thirty years is quite possible, with modern rails and pavements, as an average. Such track cannot be built cheaply in these times but we should not try to stretch the available budget beyond the elastic limit of substantial construction. It is better to shorten the program a mile now than to spend its cost in after years in excessive maintenance.

Do not design a track structure on the basis of a safety-car loading, unless satisfied that no other cars will every be run over it. No one knows whether the safety-car is here to stay, in its present light-weight form. Most properties still run much heavier cars and will continue to do so for years to come. The history of track construction reveals the fact that our early tracks were built too light. They were usually designed against loads produced by electrified horse-cars weighing about the same as our present safety cars. These tracks, and particularly the rails, did not withstand the ravages of corrosion, distortion due to undermining of track, increase in car weights and increase in operating schedules.

Do not forget that while track pavements are not strictly a part of the track structure the service which a track pavement will give is largely dependent upon the character of the track construction. The best pavement in the world will not overcome faulty track design and much of the criticism which is hurled at us today by civic authorities comes from defective track pavements.

GOOD PAVING IS A PAYING PROPOSITION

Efforts at lessening the track paving tax burden have been nullified very often by the paving conditions found in our tracks.. Whether or not these are the result of improper selection of pavement, poor track, lack of funds or whatnot makes no difference to our critics. Hence our earnest efforts must be directed toward proving that good track pavements can be constructed and that such pavements are no more costly to maintain in tracks than elsewhere under equal traffic conditions. In this connection, the writer believes that much could be attained if arrangement were made to secure the co-operation of the American Society of Municipal Improvements with our own Engineering Association for the purpose of jointly studying paving materials and standards which would be mutually satisfactory.

If we are ever to get even a measure of relief from the paving burden, we must use our publicity to the utmost. It should be convincingly shown to the public that the costs for track pavements, when required by franchise, are really tax assessments. All legal opinion supports this view and we should let the people know that their fares must pay these taxes. One way of doing this is to let our investors know it also by changing our accounting methods so that pavement costs will be entered as "Taxes: Paving." These costs are now hidden away in Account No. 10 Paving, operating expense details.

From the paving at the top to the foundation at the bottom of the track is an inverse order in which to consider the track structure. However, there is little doubt that we have looked at the track too long from the top downward. So, another "don't" brings us to the track foundation where really we should have started.

Do not forget that the foundation of the track is the most important feature. The best of rails, ties and pavements may easily be ruined, or prevented from functioning properly, if the subsoil under the track has not received the attention it should have had when the designs were prepared. The soil upon which we lay our tracks should be studied just as carefully as though we intended to erect an office building upon it. It should be analyzed and the track foundation should be built with the view of not overloading the soil. Even in the same city, we often find sections where the soils are radically different and the ballast features of the track design must be changed accordingly. Drainage plays a big part in the treatment of subsoils and the neglect to provide it has caused more track and pavement failures than any other agency. Surface drainage is an item which should receive consideration. The installation of track drains aids in overcoming underdrainage troubles by preventing infiltration of surface water.

THE SUBSOIL SHOULD NOT BE OVERLOOKED

The character of the subsoil and the treatment required to render it stable, will be a determining factor in settling the question of the need for ballast. The subsoil may be very stable and of a self-draining nature, in which case the placing of ballast of stone or concrete may be unnecessary, but statistics have shown that fully 90 per cent of the mileage of tracks in streets is now ballasted with crushed stone or gravel predominating.

The kind of ties and general form of the track superstructure will also have an influence upon the ballast question. If some form of steel tie structure is to be used, the ballast will necessarily take the form of concrete. The writer has observed that the tendency in the past has been to skimp on the amount of concrete used in such cases and when the Carnegie type of steel tie was used, the ties were spaced too widely. In using such construction recently it was found advisable to space the ties 3 ft. on centers and to place 6 in. of concrete under them with no change in level of the concrete between the ties. Before the concrete was laid on the unstable soil found in this case, it was necessary to roll broken concrete and asphalt into the trench to a depth of 4 in. Five years' service has disclosed no track troubles of moment with this construction. Some of our earlier uses of these ties had disclosed the need for more concrete and closer tie spacing. Similarly, the use of other forms of steel ties should have careful study so that we may be sure we are not building too light. We must not expect either the tie or the concrete to do work beyond its capacity.

Meanwhile, the wood tie is not going out of date, even if its price has increased. The adherence to its use is partly due to the uncertainty of the performance of substitute tie construction. It is also due to the fact that most of us know how to lay wood-tie track and we also know that good wood ties will last indefinitely in well-drained, well-paved tracks. It is also much easier to get good track built under traffic with wood ties, and many of us cannot put track out of service long enough to cure concrete as it should be cured when it is used for the track structure itself.

WIDE RANGE OF STANDARD RAILS AVAILABLE

In selecting rails, the effort should be made to use association standard rails to the fullest extent. There are now nine standard rails available. These are 80, 90 and 100-lb. standard section (80-lb. A. S. C. E. and 90 and 100-lb. A. R. A. "A") rails; 7-in. and 9-in. girder grooved; 7-in. and 9-in. girder guards to match; and two plain girder rails, 7-in. 80-lb. and 7-in. 91-lb. These nine rails should give the widest range of selection to suit almost any condition. It may be noted here that the writer believes that the 7-in. depth of rail is the predominating one used for tangent tracks and the 9-in. depth is being relegated to the obsolete class. With the passing of the old-style 8-in. granite paving block and the betterment of rail joints, the arguments formerly applied to bolster up the use of the 9-in. rail have fallen rather flat. Chicago continues with it because ordinances stipulate that it shall be used. Philadelphia probably sticks to it because old-style, deep granite paving blocks are still found there in abundance. Furthermore, the saving in weight in favor of the 7-in. rail can be applied toward increasing the amount of track obtained for a given tonnage.

In regard to joints, so much has been said about the tendency towards the use of the welded joint of some kind that it is hardly necessary to call attention to its increasing use. It is believed that some form of welded joint is an essential to first-class permanent track construction in paved streets.

Track pavement selection is seldom within the sole province of the railway company. City engineers have their say, and the railways usually have to install whatever pavement the city deems expedient. Many companies have been forced to install unsuitable track pavements for this reason and to take the blame for their poor condition as well. Such conditions call for greater efforts toward co-operation with city engineers for the purpose of securing pavements which are mutually satisfactory. The principal two questions to be decided in connection with track pavements are: (1) Is the track suitable to receive the pavement, and (2) is the pavement one suited to the track and street traffic.

LABOR-SAVING DEVICES NEED FURTHER DEVELOPMENT

The intensive use of tools and machinery designed to save labor should be continued and even extended in quarters where we have thought that machinery which would replace manual labor could not be devised. The track construction and reconstruction task has proved a fertile field for the installation of machinery, and surprising results have been attained in keeping costs down despite the rising labor costs.

There are a few features of track work which have withstood efforts to introduce mechanical in place of manual methods. The difficulties which now seem to prevent further progress in "doing it mechanically" should be the object of renewed attack and the writer believes that we will see notable developments along such lines during the next year or two. Meanwhile, our manual methods may need overhauling and a careful study of methods of doing particular parts of the work will often disclose exceptional savings which can be made through what appear to be slight changes in details.

There has been some tendency toward a relaxation in the rigidity of our specifications for materials. We have often been forced to accept inferior quality in order to keep work going. This may have led us to consider that the inferior article is good enough; especially when the price of inferior articles has been higher than the price of the best ought to be.

It is now time to take up the matter of material specifications with a view to a speedy return to a more rigid adherence to their requirements. So with the minor tools used in trackwork, we should realize more than ever that tools of poor quality are wasteful of very costly labor. Track chisels, picks and bars should be made of the most durable material obtainable. Shovels of extremely long wearing material are now available and present labor costs warrant their use more than ever. It now costs about $5.50 per day to work a shovel, whether the latter costs one dollar or two.

Moreover, having secured good tools, we should use every precaution to see that they are properly used and that they are kept in a good state of repair.

Outlook for Service-at-Cost Franchises

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THE AUTHOR gives an extended review of the service-at-cost franchises adopted during the past two years, as well as those rejected and the changes made in those modified during this period. He concludes with a discussion of the arguments against this form of franchise. For the most part, these center about the question of incentive for economical operation, and Mr. Nash finds most recent service-at-cost franchises include such a clause. In conclusion he cites such a provision in a rejected franchise which aimed to overcome objections raised to the usual form of this clause. The article is a supplement to the exhaustive one from Mr. Nash in the issue of Jan. 4, 1919.

TWO years ago the ELECTRIC RAILWAY JOURNAL gave to its readers an outline of the origin and development of service-at-cost franchises in the electric railway field. During the two years since passed there have been noteworthy additions to the list of service-at-cost cities and there is a substantial number of other cities in which service at cost is under consideration. On the other hand, experiences with earlier franchises of this form have developed certain shortcomings and criticisms which have in part been responsible for the rejection of the service-at-cost plan in several cases. All these facts should be fairly faced and analyzed before unqualified approval can be extended to this method of settling the complicated and pressing financial problems which have become particularly acute in the past two years of electric railway history.

During this period the Federal Electric Railways Commission made an exhaustive study of the electric railway situation and presented a report to the President recommending service at cost as one of the most promising steps to be taken. This recommendation, made after a most thorough investigation of this particular phase of the subject, is entitled to very great weight, and indicates that, in the judgment of this commission, any defects so far observed are not insurmountable.

It is the purpose of this article briefly to summarize the significant features of the new service-at-cost grants which have become effective, those which are under discussion and those which have failed of adoption, with particular reference to the reasons for the failures. Reference will also be made to certain criticisms of the service-at-cost program—all to the end that the advantages, disadvantages and practicable modifications of this method of operation may be clearly comprehended and our future activities in this direction shaped accordingly.

Effective New Franchises

YOUNGSTOWN

This franchise, which became effective in January, 1919, runs for a term of twenty-five years. In order to remain in full effect it must be extended at intervals of ten years. In general it is patterned after the Cleveland grant, having allowances on a car-mile basis for operating expense and for maintenance, repairs and renewals. In this respect it has departed from recent practice which has come to look upon such allowances as cumbersome and as having few practical advantages.

The franchise provides for a commissioner to supervise street railway operations and act as adviser to the City Council, which retains general jurisdiction over important proceedings including regulation of service, ordering of extensions, financing, etc. With respect to capital value and the return thereon, the program departs somewhat from the Cleveland standard in that it allows a fixed return of 7 per cent upon an initial capital value of $3,900,000, plus working capital and the fare stabilizing fund, but adds the actual interest and dividend requirements upon securities sold for additions and improvements, all of which are issued under the specific direction and approval of the city and added to capital value at par whether or not sold at that price.

Extensions and improvements to the property are handled in the conventional way, with the limitation that no expenditures for such purposes can be required by the city when they will impair the present or future ability of the property to earn the authorized return, or if required financing is impracticable.

The balance of the company's revenues, after operating and up-keep allowances are deducted, is deposited in a fare stabilizing fund, from which taxes and the return on the investment are withdrawn. For the purposes of fare regulation the lower and upper limits of this fund are placed at $50,000 and $150,000, respectively, these limits acting as automatic indicators of the requirement for increased or decreased fare. The conventional program of fare steps is provided, ranging from 3 cents to 9 cents cash, with 1 cent additional for transfers in all cases and with reductions for tickets purchased in quantities. When either end of the initial schedule of fare steps is approached, additional steps are provided for, consistent in their effects upon revenues with the steps initially established.

The city is given the right to purchase at any time on six months' notice, the purchase price being the then capital value with the usual adjustments for reserves, current assets, liabilities, etc. As the Youngstown street railway system is a part of the property of the Mahoning & Shenango Railway & Light Company, doing also a lighting business in Youngstown and railway and lighting business in other localities, it was the desire of the city that the property affected by this franchise be separated from the balance of the system if the necessary corporate arrangements could be effected. To this end the city purchase terms provide that, if a new railway company is promptly organized to take over the property affected by this franchise, the price at the time of purchase should be increased to 10 per cent in excess of that otherwise due.

In order to secure stability both of investment and service, which could not be assured if the franchise approached termination without plans for future operation, the stipulation is set up that when the unexpired life of the grant or any renewal thereof is less than fifteen years the company may amortize its entire capital value during the remaining period of the grant on a 7 per cent sinking fund basis and increase its fares to take care of the amortization requirements. If at any time during this remaining period the city should see fit to grant a renewal, the accumulation in the amortization fund may be used for extensions and improvements or to retire outstanding securities. During any amortization period the company is not required to extend its property, but may do so upon its own responsibility.

The grant contains a novel provision with respect to penalties for violation of requirements under the franchise as interpreted by an arbitration board. If the company refuses to abide by an arbitration decision, the arbitration board may, as in the case of the Cleveland grant, reduce the authorized return on the capital value by an amount not exceeding 1 per cent. Offsetting this there is the added provision that, if the city fails to carry out any arbitration requirements, the return to the company may be increased upon the order of the arbitration board by not more than 1 per cent. The grant contains the usual arbitration clause covering the settlement of a wide range of disputes, and also continues the obligation of paving repairs and renewals contained in prior franchises, which obligation has been curtailed or omitted in a number of recent franchises of this form.

Operations under this grant began with a cash fare of 5 cents, plus 1 cent for transfers, an operating allowance of 22 cents per motor car-mile and a corresponding maintenance and renewal allowance of 8 cents per car-mile. Under the operations of the franchise, fares and allowances have already been repeatedly increased to take care of increasing operating costs.

MEMPHIS

Effective April 1, 1920, the Memphis Street Railway began operations under a service-at-cost plan embodying features not theretofore employed. The program involves no change in the company's franchise, but, in response to the company's application to the Public Utilities Commission for an increase in fares, the commission, after determining the value of the company's property, prescribed a service-at-cost plan of operation under its own supervision instead of the usual local control, to the end that the company might always render service satisfactory to the city with fares automatically adjusted to the cost of such service without recurrent formal appearances before the commission.

The commission established the conventional fare index fund with lower and upper limits of $60,000 and $200,000, respectively, and a schedule of fares ranging from 5 cents to 8 cents with ½-cent steps, the range to be extended when either upper or lower limit has been approached. Except in emergencies, fares are to be changed only on any Jan. 1 and July 1, if the fare stabilizing fund has reached either the upper or lower limit and has moved toward such limit during two preceding months.

The cost of service includes a 7½ per cent return upon the established value of the property unless the fare index fund is thereby reduced below the lower limit, in which case the return may be reduced to not less than 6½ per cent. If the fund is exhausted at any time, money for the minimum return or other purposes may be borrowed, to be later made up with interest from increased revenues.

The commission established a flexible provision for depreciation annuity, under which the normal annual appropriation is 3 per cent of the property value. If, however, the accumulated reserve exceeds $500,000, the annuity is reduced to 2 per cent; if the accumulated reserve falls below $300,000, the annuity is increased to 4 per cent.

Another unusual feature is the setting up of a standard of service, determined by the commission, adequately to take care of local requirements. This standard is expressed in car-miles per revenue passenger, the upper and lower limits being fixed at 0.185 and 0.155 respectively.

In establishing a value for the Memphis railway property the commission was liberal in its recognition of development cost, cost of financing and other overhead charges often given scant consideration, so that, while the percentage of authorized return is not as liberal as appears in some recent settlements, the dollars available for investors are not unreasonably low.

In its administration of operations in Memphis the Utilities Commission has recently found it expedient to appoint a local agent. This agent performs substantially the functions of the supervisor, appointed under most service-at-cost grants as the representative of the city.

ROCHESTER

A new franchise was granted to the Rochester lines of the New York State Railways, effective Aug. 1, 1920, for a term of ten years, with provisions for renewal after the expiration of nine years. Supervision of operations under this franchise is in the hands of a Commissioner of Railways, who has exceptional authority in all matters having to do with the service or property. He is limited with respect to extensions that may be ordered because of the short life of the grant, which states in dollars the limits by years permitted after the first five years.

The usual fare stabilizing fund is provided with lower and upper limits of $200,000 and $500,000, respectively. The automatic fare schedule also contains the usual steps, the initial rate being 7 cents cash, 6½ cents tickets. The rate of return varies with the rate of fare, being 6 per cent for a cash fare of 7 cents or more, and grading upward to 8 per cent, if a 3-cent cash fare should ever be reached.

If it is necessary to borrow money at an actual cost in excess of the base allowance of 6 per cent, the excess over this rate is charged as an operating expense.

Accruals for depreciation are at the rate of 2 per cent per annum on the capital value, but the accumulated reserve is limited to $600,000.

Arbitration is provided for, and each party to the agreement bears one-half the cost of arbitration proceedings from its own funds.

The company reserves to itself exclusive control over its corporate affairs, selection of officers, employees, etc., and is authorized to arrange "supplemental transportation" if it appears in the interests of the city. One-man cars are also specifically permitted. No provision is made for city purchase. The initial capital value was temporarily placed at $17,500,000, but is later to be determined by agreement or arbitration.

TOLEDO

After many years of bitter controversy over the street railway situation in Toledo, the city and the Toledo Railways & Light Company have finally agreed upon operation under a service-at-cost grant which now awaits only the formal acceptance of the company before going into effect. The same problem of separating railway property and operations from other activities of the company arose as in the case of Youngstown and was solved in Toledo by the organization of the Community Traction Company, which will be a subsidiary of the present combined company.

The grant provides for transportation service by rail "or otherwise" for a term of twenty-five years, with renewal, lease and purchase features. The general responsibility for operations rests with the City Council, although the grant provides for a Board of Control of three members appointed by the Mayor, to act without compensation, as advisers to the City Council and to the commissioner. The commissioner has immediate charge of the street railway service and acts as technical adviser to the Board of Control and the City Council. The city also has at least one member on the traction company's board of directors, but if the common stock of the company owned by the city bears a sufficient proportion to the total capital value, the city's representation on the board may be increased. The company votes the issued common stock until it has been acquired by the city.

The capitalization scheme of the newly organized Community Traction Company is of interest. Initially it will issue $8,000,000 of bonds covering existing railway property, plus $2,000,000 of preferred stock to provide working capital, a fare stabilizing fund and funds for rehabilitating and rearranging the existing property. There is provided in addition $10,000,000 par value of common stock, all to be initially held in trust, but ultimately to be acquired, in part at least, by the city under conditions later described. The capital value for rate purposes includes only the initial bonds and preferred stock and such additions thereto as are necessary to take care of extensions and improvements to the property. It is intended that through future financing the preferred stock issue shall be increased to not less than 40 per cent nor more than 60 per cent of the capital value.

The cost of service, as defined by the franchise, includes expenses of operation; an accrual to be determined by the Street Railway Commissioner for maintenance, repairs and renewals, the amount not necessarily being uniform from year to year or from month to month; taxes and public charges of all kinds, including income taxes and interest on floating debt; a depreciation annuity of not less than one-half of 1 per cent nor more than 1½ per cent of the capital, with an accumulated reserve of less than 4 per cent of the capital value; a sinking fund of 2½ per cent of the capital value, but not accumulating to more than 20 per cent. and return to investors, including interest at 6 per cent on the bonded indebtedness and dividends at 8 per cent on the preferred stock.

All the above items of cost are cumulative. With the exception of interest and dividends, they are taken directly from operating revenues. Monthly balances are deposited in the fare stabilizing fund, from which returns to investors only are taken. The fare stabilizing fund has lower and upper limits of $300,000 and $500,000 initially, but ultimately they will become 3 per cent and 5 per cent, respectively, of the capital value.

The original fare schedule contains fourteen steps lying between 5 cents and 7 cents cash, with reduced ticket rates and a 1-cent charge for transfers under all rates. This schedule may be extended up and down without limit to meet wider ranges in cost than provided for by the original steps. The initial cash fare will be 6 cents.

The City Council, the Board of Control or the company may propose extensions which the company is required to make if the necessary financing can be reasonably accomplished and the present or future ability of the company to earn the authorized income is not thereby impaired. Where new property elements take the place of old, only the excess cost of the new elements over the cost of the old elements at the time of the replacement is added to capital value. By this arrangement the capital value is not increased in connection with replacements by any increase in general price levels.

The 2½ per cent sinking fund included in the cost of service is used to retire outstanding bonds up to 20 per cent of the total capital value. As these bonds are retired an equal par value of common stock is released to the city, but without any corresponding reduction in capital value. To that extent the city has an increasing ownership in the property, but limited to 20 per cent, except for amortization features referred to below.

The city may, on six months' notice, purchase the property of the company at any time at the then capital value plus premiums on outstanding bonds (4 per cent) and preferred stock (8 per cent), less common stock issued to the city, and with the usual adjustments for reserves, etc.

The city may also, after a favorable referendum vote, lease and operate the property of the company, paying all taxes and public charges and 8 per cent return upon the entire capital value less bonds and preferred stock retired. The city must also, under such lease, accrue 4 per cent of the capital value in place of the prescribed bond sinking fund for amortization purposes. When, under such lease, the city has retired not only the remaining outstanding bonds but also the entire preferred stock, it may take over the property without further capital payments. The city may also elect, when the salvage value of the property only remains in outstanding securities, to continue the lease indefinitely by extending the franchise from time to time and paying into the amortization fund only such amounts as are necessary to bring new property elements down to their salvage value.

The company, under such lease, may build extensions to the property, but it is not required to do so. If the city terminates a lease at any time and returns the property to the company there must be a franchise extension if necessary to give the company a ten-year period of operation, in which it may amortize all remaining outstanding securities, charging the necessary higher fare for that purpose. At the end of such period the property reverts to the city without payment other than adjustments.

If the city elects neither to lease nor to purchase, and the franchise term comes to less than fifteen years' balance, the company is authorized to increase its fares sufficiently to amortize the outstanding securities uniformly during the period. Additions which the company may make to the property during this period with the approval of the city may be amortized during the balance of the grant, but no such additions shall be required.

When, at the final expiration of the grant, all securities outstanding have been retired, the system becomes the property of the city. If an offer of renewal or extension of the franchise is rejected by the company the privilege of amortization does not apply until fifteen years from the end of the extension offered.

It will be recalled that Toledo has made various unsuccessful efforts to purchase the local railway property, but has encountered insuperable obstacles. It should be pointed out that the present franchise provides not for service at cost but service at cost plus an installment of the purchase price of the property, and so the car riders under the operation of this grant will necessarily pay a part of the cost of service belonging to future years. If the desire for municipal ownership should disappear under peaceful and satisfactory operations under this franchise, and extensions thereof, rather than purchase or lease should be made, the city's interest in the property would be limited to 20 per cent and the amortization burden of the present generation of car riders would not be serious. Under the lease provisions or in case of failure to renew the grant, however, the cost of service might increase to a burdensome extent. Other than for this feature of the franchise, it holds promise of a successful solution of long-standing difficulties.

PADUCAH

The reference to service-at-cost settlements effected during the past two years would not be complete without mention of a franchise involving some service-at-cost features which became effective in Paducah, Ky., on Oct. 1, 1919. In negotiating this franchise it was found expedient to avoid many of the complications contained in the usual service-at-cost grants if reasonably satisfactory adjustments of fares could otherwise be secured. The new franchise, therefore, simply provides for annual adjustments of fares to meet existing cost of service, as shown by the experiences of the preceding year, but without definitely determining a fixed value of the property or the return which should be allowed thereon.

Rejected Franchises

Attention should now be directed to certain service-at-cost plans of operation which have been drafted in substantially complete form by agreement between interests representing the cities and their street railways, but which have finally been rejected. These rejected agreements are referred to because they embody features which may be of interest or assistance in connection with future drafts of this kind.

DENVER

Early in the war period the Denver Tramway Company found itself in need of additional revenue which was not adequately provided after recourse to various public authorities. A committee of representative citizens was finally appointed to investigate the situation and report to the Mayor as to the best solution of the difficulties. This committee, after thorough and impartial investigation, reported that a service-at-cost plan of operation under the existing franchise was desirable. An agreement of this kind was accordingly prepared embodying service-at-cost features not radically different from those recently encountered, among which the following may be mentioned:

Supervision is lodged in a Board of Control consisting of three members, two representing the city and county of Denver and one the company. The normal rate of return allowed (after a preliminary lower rate) is 7 per cent, with a graded bonus for efficient operation, fixed by the rate of fare in effect. The maximum bonus is 1 per cent, applying only when the fare is less than 5 cents; at 5 cents the bonus is three-quarters of 1 per cent; at 6 cents, one-quarter of 1 per cent, and at higher fares, nothing. Accruals for depreciation were fixed at $450,000 per annum instead of the usual percentage on the property value. The fare stabilizing fund has lower and upper limits of $100,000 and $500,000, respectively, with an unlimited schedule of fares in half-cent steps, with free transfers.

The company is freed from franchise taxes, bridge rentals and paving costs and repairs. The original recommendation of the committee that no free transportation of any kind be granted was not embodied in the franchise. The conventional arrangements for arbitration and city purchase were also included.

This agreement, together with another simpler one for fare regulation proposed as an alternative, was rejected by referendum vote in October, 1919, by the very narrow margin of 235 votes out of a possible voting list of nearly 100,000. The rejection was apparently based not on the program itself, although the valuation agreed upon was criticised, but upon any rearrangement which would not place some restrictions upon fares.

MINNEAPOLIS

Early in 1919 a service-at-cost plan of operation was drafted for the City Council of Minneapolis as a solution of existing fare deficiencies. The program was approved by the Council, but was strongly opposed by the Mayor, and was finally defeated by referendum in December, 1919.

The general program does not depart substantially from the usual provisions of such grants. The authorized rate of return upon a $24,000,000 value was 7 per cent, the return on additions to be at cost plus 1 per cent, unless the city should undertake to guarantee this cost rate. The allowance for maintenance, repairs and renewals was 2¾ per cent of the capital value, plus 9 per cent of the annual revenue. The fare stabilizing fund had lower and upper limits of $150,000 and $500,000, respectively, and the schedule of fares showed the unusually large difference of 1 cent between steps. City purchase at the capital value and purchase by a licensee at a 10 per cent higher amount were included. The requirements for paving, cleaning, watering and oiling of streets could be waived by the city if excessive fares resulted therefrom.

ST. PAUL

The Twin City Rapid Transit Company had the same difficulties with an inadequate revenue in St. Paul as in Minneapolis and undertook negotiations to remedy the situation at about the same time. A service-at-cost draft was presented by the company to the city embodying provisions not radically different from those recommended in Minneapolis. This proposition was never accepted by the City Council, which, on the contrary, proposed a regulatory program wholly unsatisfactory to the company. Obviously the two main divisions of the Twin City system could not be operated under substantially different fare and service regulations without embarrassing complications, and these were considered in St. Paul after the rejection of the Minneapolis program.

HOUSTON

After exhausting other efforts to secure increased fares, the Houston Electric Company early in 1920 secured an injunction through the federal court against a 5-cent fare ordinance. In connection with the court proceedings, the value of the property was determined as well as the fair return and allowances for depreciation. These matters having been established, the city and the company undertook to agree upon a new franchise on a service-at-cost basis which would settle future fare and service problems. The final agreement between city officials and company officials, which also had the approval of an advisory board of citizens, was embodied in a franchise draft which the City Commission voted to submit to referendum without prior passage or indorsement. The indorsement was withheld because some opposition developed among the city officials to a few provisions of the draft, including the specified rate of return. The company felt that complete co-operation was necessary for the successful functioning of the proposed settlement, and, because of the lack of unanimous support, it requested that the draft be withdrawn from referendum until such time as complete co-operation might be secured.

The service-at-cost draft, as agreed upon, embodied some interesting features. It covered service by street railway or "other method of transportation." The Board of Control, which was to have jurisdiction over operations under the franchise, was composed of four regular members, two appointed by the city (one of whom must be the Mayor) and two appointed by the company. If these four were unable to agree upon procedure in any matter, a fifth member was selected to sit and decide with respect to this particular matter.

A return of 8 per cent upon the capital value was stipulated for at least seven years of the thirty-year term. A supplementary return was provided as an incentive for efficient operation not exceeding 1 per cent, which was authorized when a 5-cent fare became effective. The highest fare at which the incentive applied was 7 cents cash when the incentive was one-fifth of 1 per cent.

The fare regulating fund had a normal initial amount of $250,000, to be increased from time to time with the development of the property and its business. The maximum and minimum amounts of this fund—the points at which changes are automatically required—were 40 per cent above and 40 per cent below the normal, respectively. Changes in the fare were to be made quarterly when the fare regulating fund indicated the necessity.

The depreciation accruals were intended to accumulate by annuities not exceeding 4½ per cent of the depreciable property value. a total reserve lying between 8 and 10 per cent of such value.

Franchises Under Consideration

In addition to the above cities in which definite steps have been taken to bring about service-at-cost operation, a number of other cities have given the subject considerable attention as a solution of problems resulting from inadequate fares and service. In some cases this solution has been rejected, while in others it is still under investigation. A brief mention only of these cities, with the significant developments, is permissible herein.

INDIANAPOLIS

Early in 1920 the Indiana Public Service Commission, at the request of the city, undertook to draft a service-at-cost plan to solve fare difficulties. This general plan was approved by the company, but, after extended negotiations, the city recently withdrew its application to the Public Service Commission to settle the matter on this basis because of a feeling that, due to its lack of an incentive for efficient operation, the conventional service-at-cost program did not offer a satisfactory solution.

BUFFALO

In 1919 this city undertook to settle its controversy with the International Railway Company by a service-at-cost plan. Enabling legislation agreed upon between the city and the company was, however, vetoed by the Governor, following a protest from the Public Service Commission. The Mayor of Buffalo not long ago revived his interest in this form of settlement, but nothing has so far been accomplished.

DETROIT

Detroit, in 1919, after years of controversy quite similar to those which Cleveland and Toledo have experienced, received from its Board of Street Railway Commissioners a report recommending service-at-cost operation. Although this report was indorsed by the business interests of the city, it was strenuously opposed by the Mayor, and ultimately rejected by the city in favor of a municipal ownership program.

LIMA

During the past year service-at-cost has been proposed for the lines of the Ohio Electric Railway in Lima. The proposition was opposed by a citizens' committee, and no action has yet been taken thereon by the City Council.

NEW ORLEANS

The receiver of the New Orleans Railway & Light Company recently proposed a program of this form for settling the fare and wage controversies which have been pressing in New Orleans. This suggestion was indorsed by special masters who served in a wage controversy, but no definite action has resulted.

SYRACUSE

The New York State Railways proposed service-at-cost for its lines in Syracuse similar to the plan adopted for the part of its system located in Rochester. A valuation of the property was made by a committee, but the whole program was finally rejected by the City Council in November, 1920, apparently because of the higher fares which would probably be necessary thereunder, it being alleged that the proposed valuation was excessive.

LOUISVILLE

The officials of the Louisville (Ky.) Traction Company suggested in July, 1920, that its inadequate fares be taken care of automatically under a service-at-cost agreement. The City Council rejected the suggestion, but the matter has recently been reopened by the Mayor.

PITTSBURGH

In 1919 a report on the value of the railway property in Pittsburgh (Pa.) was made by a joint board, and the proposition that a service-at-cost agreement be entered into was indorsed by the Allied Board of Trade. Following this action, the Mayor, in April 1920, proposed negotiations looking to such a settlement, but definite results are still lacking.

AKRON

More favorable developments are in prospect for the lines of the Northern Ohio Traction & Light Company operating in Akron. The general terms of a service-at-cost settlement have been informally agreed upon between the City Council and the company. The tentative agreement provides for a return of 7 per cent when fares are 6 cents or higher, and a supplementary return of one-quarter of 1 per cent for each step in the fare schedule lower than 6 cents, the steps being ½ cent each. An additional return is allowed to take care of any higher actual cost of future borrowed funds. A sinking fund is provided to amortize the capital value if the franchise comes to within ten years of expiration without being renewed. The city waives its right to assessments for new paving, although the company undertakes to keep existing paving in repair. If extensions to the system are needed and the company is unable to procure the necessary funds the city may finance them and get the same return thereon as is allowed to the company. The company is authorized to operate an auxiliary bus service if it appears to be a desirable substitute for track extensions into outlying territory. The city may purchase or lease upon a year's notice.

NORFOLK

In 1919 service-at-cost was proposed for the railway lines in Norfolk (Va.) by the City Manager, and the city has gone on record as favoring liberal treatment of all industries which are located therein. No definite action with reference to the railway has been taken, although a recent report of the consulting engineers retained by the city to investigate the local situation strongly advises a settlement embodying service-at-cost features. The matter will doubtless have further attention in the near future.

GRAND RAPIDS

The franchise of the railway lines in Grand Rapids (Mich.) expires in 1921. A valuation of the property is now being made and the draft of a new franchise containing service-at-cost features is in progress.

ST. JOHN

An interesting plan for the operation of the public utilities in St. John (N. B.), including the street railway, was proposed in 1919 by a special commission appointed by the Lieutenant-Governor in Council. Under the proposed plan a basic return of 7 per cent is suggested, this rate to be increased by 0.1 per cent for each 1 per cent, by which the average rate is reduced below that existing in the first six months of 1919, and the basic return may be reduced similarly for any necessary increases in rates, but not below 6 per cent, nor are increases effective above 9 per cent. The rate of return is to be adjusted semi-annually. Control of the company's affairs is to be vested in seven directors, four chosen by the company and three appointed by the Lieutenant-Governor in Council. Sale to the province is provided for at the capital value plus 10 per cent. The proposed depreciation provision is such as to accumulate and maintain a reserve amounting to 7 per cent of the capital value. No action on the proposed agreement has been reported.

NEW YORK

In his latest annual report to the Legislature of New York, Commissioner Nixon of the First District recommended the adoption of service at cost as the best solution of the acute traction problems of the New York city systems. An unsuccessful attempt was also made in 1920 to pass legislation in New York permitting any city to adopt service at cost for its local railway system.

Old Franchises Amended

In addition to the new and proposed service-at-cost franchises above outlined, it may be of passing interest to note changes which have been made in certain of the older grants that have previously been fully described.

CLEVELAND

On May 1, 1919, the Cleveland franchise was extended for a period of ten years, making its expiration date 1944 instead of 1934. This was in accordance with the original provisions of the grant under which, without such extension, the powers of regulation vested in the city would have been suspended. In 1919, also, the railway called for arbitration proceedings in an endeavor to increase the authorized rate of return from 6 per cent to 7 per cent. This increase was approved by the arbitration board, but failed of ratification by referendum vote and has not become effective.

DALLAS

In 1919 the Dallas (Tex.) franchise, of the service-at-cost form with a maximum fare limitation, was found to be yielding wholly inadequate revenues. Upon presentation of the facts to the City Commission the fare limitation was increased in 1920 from 5 cents to 6 cents. It is now being contended by the company that this limitation should be removed, as the actual cost of service is approaching 8 cents. The city so far has not shown any disposition wholly to remove the present limitation.

KANSAS CITY

Operation in Kansas City (Mo.) under a franchise providing for division of possible profits with a 5-cent fare instead of service at actual cost proved so unsuccessful under war emergency conditions that the fare limitations were removed by order of the Public Service Commission. In spite of this relief the company has been placed in the hands of receivers. The local Chamber of Commerce has undertaken an investigation of the situation with a view to working out a permanent solution. It has recommended a service-at-cost plan under which the rate of return would be 6 per cent, plus a supplementary incentive depending upon the rate of fare. Elimination of requirements for street paving, cleaning, etc., was also recommended.

DES MOINES

The franchise under which the city of Des Moines, Iowa, has been operating for a number of years, having service-at-cost features but with fare limitations, also proved unsatisfactory and receivership followed. In an effort to work out a new settlement Des Moines has recently had an appraisal made of the property for use in a real service-at-cost agreement. The ideas regarding valuation and other features of such settlement which have so far been advanced by the city have not been at all acceptable to the company, and no prompt settlement of the controversy is in prospect.

In all of the above cases it appears that difficulties have occurred on account of the fare limitations. To the extent that such limitations have been insisted upon by the city, results unsatisfactory alike to the railways and the communities have followed. Fare limitations within the range of reasonable requirements are noticeably absent from the proposed new grants, indicating that the cities are prepared to meet the cost of the service which, in the exercise of their rights, they prescribe for their own accommodation, regardless of what the necessary rate of fare may be.

Summary

A review of the foregoing outlines of action with respect to service at cost, taken or under consideration during the past two years in something over twenty cities, discloses some features of interest. Out of seven carefully developed and complete service-at-cost plans four were put into effect during this period, two were rejected upon being submitted to popular vote and one was withdrawn by the company before final action. Of the two rejected franchises, one had the hearty indorsement of the business interests and the city administration and was rejected by an exceedingly small margin, apparently on account of the fear of radical increases in fares. The other rejection was largely the result of pronounced opposition on the part of the Mayor. In neither case was the opposition based upon specific criticisms of fundamental principles of the program.

Of the dozen cities in which less complete consideration has been given to service-at-cost operation, there have been three cases of definite rejection. Of these three rejections, one was based wholly upon political grounds and was against the recommendations of an investigating commission and of business men generally. Another was apparently due to unwillingness to accept the probable higher cost of transportation which the program involved. Only in the third case of rejection was there any criticism of the principles upon which service at cost is based. In Indianapolis, after investigation of service-at-cost operations in other cities by the chairman of the State commission and other interested officials, it was agreed that none of the plans in operation or proposed provided adequate insurance against inefficient operation because of the lack of incentive for efficiency so far developed.

Because of the specific rejection of one service-at-cost plan on the grounds of lack of suitable incentive to efficient operation, and criticisms to the same effect from a number of other sources, it appears appropriate to give some consideration to this phase of the subject. Clearly if, as claimed, the result of service-at-cost operation is that the properties are managed without proper regard to reasonable limitations in wages and salaries, to the procuring of necessary supplies at lowest obtainable market prices and to the utilization of labor, materials and appliances in accordance with the best modern practice, a serious defect exists, and if this defect cannot be corrected, service at cost may not be wholly acceptable as a solution of our railway problems. If, on the other hand, a study of actual service-at-cost results shows that inefficiency has not been in evidence or that suitable incentives to prevent it are available, then this alleged defect need not be considered as vital.

In the report of the Federal Electric Railways Commission the following reference to service at cost appears:

> Generally speaking, the main criticism of this form of contract is that it tends toward inefficiency and uneconomic operation; that it contains no provision for the control of strikes or uninterrupted service, and that labor and management may co-operatively increase the cost of operation to the point where the public may be unduly burdened.

After further discussion of the subject, the commission decided that the criticisms are "more theoretical than real," and its general conclusion with reference to the matter is stated in the following language:

> We strongly recommend the principles of the service-at-cost contract, not as the only solution but as one means of solving a very difficult problem.

As opposed to this strong recommendation, consideration should be given to statements made in connection with the Indianapolis investigation referred to herewith. In its motion for withdrawal of the application to the Public Service Commission for the development of a service-at-cost plan for Indianapolis the city said:

> We have been unable to find or agree upon any plan of operation on the basis of service at cost which would furnish the incentive of private ownership in an operation of service at cost. The result of our investigations generally has been to raise a most serious question and doubt as to the wisdom of the service-at-cost plan. The inevitable tendency seems to be for the operator or company readily to accept increased cost of operation with the view that it can be passed on to the public by higher fares. Such a course results only in adding to the burden of the public.

E. C. Lewis, chairman of the Indiana commission, in an address delivered at a recent meeting of the National Municipal League in Indianapolis, made the following statement with reference to the outcome of an investigation of actual service-at-cost results which he and attorneys representing the city and the railway company had made:

> I fear that service at cost simply means that the lid is taken off. It is possible that some time in the future some workable plan incorporating incentive for efficiency and initiative will be worked out. While the commission does not pass finally on service at cost, nevertheless it seems to most of us to run contrary to human nature, which, at least in business, requires opportunities of a struggle for gain. Psychologically, the blocking out of rates which shall apply if operating expenses increase threatens to become an open invitation for laxity.

At the same meeting in Indianapolis Fielder Sanders, Street Railroad Commissioner under the Cleveland franchise, expressed contrary views, contending that, because of the unparalleled period of operation under this grant and the entire lack of special incentive for efficient operation, Cleveland should be the best possible test of alleged extravagance. Logically, Mr. Sanders holds, the test of efficiency is the rate of fare in effect to cover the cost of service. The Cleveland fare has been consistently as low as or lower than that in other cities of similar size in which fares have admittedly covered the cost of service. It has been at times contended that the fare in effect in Cleveland did not cover the entire cost of service, but, as far as operating costs and provisions for current upkeep of the property are concerned, such criticisms would not hold, at least during the past few years.

Experience in other cities has been comparatively brief, but, as far as it goes, there have been no reported charges of extravagant operation in any case with the possible exception of Cincinnati. In connection with the Indianapolis investigation, it was pointed out that fares in Cincinnati had rapidly risen to a point much higher than in Indianapolis, but only by inference could it be held that inefficiency in Cincinnati was alleged. Careful comparative studies have clearly shown that operating conditions in Cincinnati are decidedly unfavorable and necessarily involve high costs. Published reports indicate that the operations of the Cincinnati railway have had uniformly careful attention and the closest scrutiny from both city and company officials. The inference is, therefore, fairly drawn that the menace of inefficiency due to lack of incentive is, as stated by the Federal Electric Railways Commission, "more theoretical than real."

TREND TOWARD INCENTIVE FEATURES

Notwithstanding this conclusion, a noticeable number of new franchises have included incentive features. Of the four complete programs which became effective during the past two years one contained a provision for increased rate of return when low fares were maintained. Of the three complete drafts which were either rejected or withdrawn, two contained similar incentive clauses. Among the other cities in which service at cost has been discussed at least two of the tentative programs included incentive features. This indicates a fairly definite feeling that incentive is desirable, and there is undoubted truth in the contention that the hope of reward is conducive to increased alertness. The whole history of business activities is corroborative of this view. It has been claimed by certain critics of service at cost that an incentive provision converts it into a cost-plus proposition. If such were the result, the purpose of such a provision would be defeated and it should be abandoned. The real purpose of an incentive clause is so to increase efficiency of operation that the investors may share in the resultant saving in service cost and fares may also be reduced below those prevailing without such incentive.

An examination of the incentive clauses so far provided discloses very few which are directly effective under present conditions. The operating bonus included in the Montreal grant undoubtedly encourages careful operation and will continue to do so unless the annual allowances are so closely adjusted by the Tramways Commission as ultimately to discourage the hope of obtaining the bonus. In other franchises the incentive is based upon the rate of fare on the assumption that more economical operation will produce lower fares, which, in turn, will yield a higher return for the investors. Recent increases in operating costs have necessitated fares so high that no supplementary returns have been available, and unless or until operating costs are substantially reduced the effectiveness of established incentive provisions will be negligible.

It has been pointed out that, under widely varying costs of service, the incentive provision really operates as a penalty, because, when operating costs are high, money costs are correspondingly high, whereas investors should have a higher return instead of the lower one which is actually available under the operation of the established incentive provisions. And the reverse of this proposition is equally true, *i.e.*, that when operating costs and money rates are low the supplementary return may not be needed adequately to compensate the investors in the enterprise.

It appears, therefore, that some different form of incentive should be devised if an incentive is really desirable. In connection with one of the recently rejected service-at-cost plans an interesting provision was drafted which appears to have some merit. It was rejected in part because of its obvious complications. This incentive provision was based upon the assumption that railway costs of service increase substantially in proportion to costs in other productive industries, and that if some measure of such other costs can be established the relation between the two costs might be made the basis of a supplementary return to electric railway owners. The difficulties of establishing a measure of general costs in industry are obvious. The most logical basis appears to be the weighted average wholesale price of commodities as represented by the index numbers regularly determined by the United States Bureau of Labor Statistics. Before the recent war this index number was fixed at 100. At that time a 5-cent fare was practically universal on electric railways, and no one will contend that such a fare was unreasonably profitable. The ratio between the wholesale index number in 1914 and the prevailing cash fare in cents was 20 to 1. Since 1914 the wholesale index number has increased more than 100 per cent. Only a negligible number of street railway fares, if any, have increased in proportion. The lower the fares could be kept in proportion to this index number the more efficient railway operation would appear to be. If, for example, with a wholesale index number of 210, which is not far from that now prevailing, a 7-cent fare is maintained, a ratio of 30 to 1 exists instead of 20 to 1, which prevailed before the war. In the proposed draft on this basis, above referred to, a supplementary return of 1 per cent was authorized when the ratio of wholesale index number to average fare was 20 to 1, or lower. It became zero with a ratio of 30 to 1, or higher, and was uniformily variable for the ten steps between these two limits.

The complications of an incentive provision of this particular form may be prohibitive, but if a workable and readily understood incentive plan embodying the principles stated could be developed it would appear to have advantages in logic and effectiveness over any of the incentives so far offered.

In the absence of an effective feature of this kind service at cost has so far been generally successful in maintaining good service and credit and in avoiding receiverships and local controversies, which are detrimental to communities as well as railways. The delays incident to prolonged investigations by public service commissions or other regulatory authorities or court proceedings have also been avoided. This feature alone may more than offset any slight disadvantages otherwise accruing to service-at-cost cities. It is not clear that such disadvantages should be substantially greater under service-at-cost operation than under equally effective but less prompt regulation on the part of public service commissions.

Status of Heavy Traction Abroad

In All Countries Where Coal Is Scarce, and Especially Where Water Power Is Plentiful, Active Planning for Railway Electrification Is Under Way — Switzerland and Italy Are Naturally Among the Leaders, but France and Other European Countries, with Great Britain and Her Colonies, Are Not Far Behind

THE world electrification situation is not favorable for statistical analysis because the most interesting phases are still in the future and subject to much modification. At the same time the annual statistical issue of the ELECTRIC RAILWAY JOURNAL is an appropriate place in which to set down some of the plans which are being made and to point out the tendencies which these plans show. This article represents an attempt to do these things, although it is not intended to be comprehensive or exhaustive. It does not mention many electrifications which may seem to some to be important and it does not treat the situations in the several countries in a uniform fashion.

The article does, however, draw from a number of authoritative sources some of the latest information available as to the planning of the several countries which will profit greatly by electrification. Probably by the end of this year there will be much to record of the ways in which these plans are being carried to fulfillment.

Great Britain and the Colonies

Electrification Has Made Some Progress and Plans Are Being Made, but Much Depends Upon the Status of the Railways Still Undetermined

DOWN to the present time there are in all thirteen examples of conversion of steam railways in England to electric traction. This is apart from the London "tube" railways which were built as electric lines. Out of the thirteen, four are small undertakings which may be passed over by naming them, the East London Railway, the Hammersmith & City Railway, the Mersey Railway and the Morecombe & Heysham branch of the Midland Railway.

Coming to more important undertakings, it may be noted generally that the conversion was carried out to enable the lines to cope more successfully with heavy passenger traffic and to develop more of it in extra suburban areas. As regards parts of the lines in London which are underground, there was also the great advantage of getting rid of the fumes from steam locomotives. The result has been that traffic has grown so that sometimes it is almost overwhelming on certain routes. Electric traction is largely confined to passenger service. On those lines which also give freight service steam locomotives are still used.

LONDON WAS A PIONEER IN HEAVY TRACTION

The first two steam railways in London to be converted for electric operation were the Metropolitan District and the Metropolitan Railways. Both began electric working in 1905. The former has a route length of about 27 miles, but with its connections over which it runs the length is 41 miles, or more than 80 miles of track. This railway runs underground east and west through the heart of London, with several branches in the western suburbs. In the East End it joins onto the Tilbury & Southend Railway, and its central section also forms part of the Inner Circle, the rest of which is owned by the Metropolitan Railway. A third-rail, positive conductor carries current at 600 volts, and a fourth rail, also insulated from earth, forms the return. Automatic interlocking signaling, supplemented by automatic train stops, permits a train service with less than two-minute headway to be given during the busy hours. Where the traffic is heaviest there is unfortunately only double track. With certain exceptions, all trains are on the multiple-unit system. About 240 motor cars and a like number of trailers are owned, each of the former being equipped with two 200-hp. motors. In addition, the company has six electric locomotives, each having four motors of 240-hp. capacity each. These locomotives are used for hauling over the company's lines through trains for Southend, 40 miles away on the coast. Steam locomotives take these trains when beyond the District Company's area.

STEAM ROADS GRADUALLY ADOPTING ELECTRIC TRACTION

The Metropolitan Railway owns the northern half of the Inner Circle and a main line with branches stretching out northwestward into the country. Only the lines in and near London have been electrified, the route length so treated extending to 26 miles, giving 59 miles of single track. The electric equipment is the same as that of the District Railway. There are some 160 motor cars and 250 trailers, each of the former having four 200-hp. motors. For some of the longer trips electric locomotives are used to haul ordinary railway rolling stock. The company owns twenty such locomotives, and each is fitted with four 200-hp. motors.

Electric traction began on one of the suburban lines of the London, Brighton & South Coast Railway about the end of 1909, and it was gradually extended to the other suburban lines until the war put a stop to further work. Some 22 miles of route, involving 70 miles of track, are operating electrically. This is the only example in England, apart from the short Morecombe line already mentioned, of single-phase traction. The voltage used is 6,700 and the frequency 25 cycles per second. Overhead contact construction is, of course, used.

The second of the big railway companies running out of London to adopt electric traction for its suburban service was the London & North Western, its first electric section starting in 1914. It took over and converted the North London Railway (steam), which serves the city and the region north of the metropolis and connects with the North Western's main line. This railway built two additional tracks electrically equipped alongside its main line all the way to Watford, some 20 miles out, and began an expensive widening involving additional tunnels in North London to bring the electric service right into its London terminus at Euston. The last-mentioned work, tied up by the war, is not yet completed.

The Baker Street & Waterloo Railway Company in 1917 extended its tube railway northward to a junction with the North Western near Willesden, and through electric trains are run from it on to Watford. When the scheme is complete North Western suburban passengers will have a choice of three routes into or out of London. The electric zone extends to 41 miles of route with 80 miles of track. The equipment is similar to the other underground railways, and multiple-unit trains are run throughout.

The last electrification scheme carried out in the London area was that of the suburban lines of the London & South Western Railway. The first section began working electrically in 1915, and despite difficulties arising out of the war the work of conversion was continued until all the routes for a distance of more than 10 miles out of the metropolis were equipped. The length of route so dealt with is 49 miles, involving 150 miles of track. Unlike most of the electric railways in the district, this one uses no fourth rail negative conductor, the track rails forming the return. The unit train consists of three coaches—heavy compartment rolling stock with cross-seats as on the steam lines. The horsepower of the motors per train is about 1,100. When required, two units are coupled to make a six-car train. About 300 ordinary steam railway carriages have been converted for the electric service. It should be understood that only some of the numerous tracks on the main line out of Waterloo terminus have been electrified, the long-distance steam trains running over the others.

SOME ELECTRIFICATION AWAY FROM LONDON

There are only two important examples of steam railway electrification in the provinces, one being parts of the system of the Lancashire & Yorkshire Railway and the other the Newcastle suburban and Tyneside lines of the North Eastern Railway. In regard to the former, the start was made by the opening for electric service in 1904 of the main line from Liverpool to Southport. This was the first example in the country of something like a main electric railway with stations at considerable distances apart and consequent high speeds. It is on the ordinary third-rail, 600-volt, direct-current system and multiple-unit trains are used throughout. Several branch lines were afterward electrified, and more recently the railway made a new departure by equipping its Manchester-Bury section, comprising some 27 miles of track, with protected side-contact third-rail conductor carrying direct current at 1,200 volts. This is the first thing of the sort in England and it has proved highly satisfactory. In all about 60 miles of route, or 120 miles of track, of the Lancashire & Yorkshire Railway is working electrically. The motors aggregate 800 hp. per motor car, and some 200 motor and trail cars are in use.

The Newcastle local lines of the North Eastern Railway were electrified in 1904, and have a route length of 35 miles, with 82 miles of track. The usual third-rail system is employed. The multiple-unit trains have in all about seventy motor cars (each with two 150-hp. motors) and sixty trail cars.

The North Eastern Railway in 1915 electrified its Shildon to Newport (Middlesbrough) mineral railway, 19 miles long, with overhead contact conductors and 1,500 volts direct current. Electric locomotives are used for hauling the coal trains from the mines down to the port and bringing them back empty. This is the only example of the kind in England.

In regard to plans for the future, there is no prospect of any railway in Great Britain carrying out any electrification until the status of the railways is defined. At present they are still under government control and their finances are not healthy. The control is to come to an end in August next and what will be the conditions after that it is hard to say. Large sums are in dispute between the companies and the government under various war agreements as to guaranteed receipts, maintenance, etc. No capital can be raised for railway purposes until the future is clearer. Besides that, the high cost of equipment at present favors delay.

Looking forward, the directors of the London, Brighton & South Coast Railway have submitted for the approval of the Minister of Transport a complete scheme for the electrification of the great bulk of their system, including the main line to Brighton. The single-phase system will be used as on the existing electric lines of the same company. Developments on other railways are likely to be carried out on the direct-current system at 1,500 volts, as recommended by the Ministry's advisory committee. The North Eastern Railway directors a year or more ago approved in principle the conversion of their main line between York and Newcastle, a distance of 80 miles, and of a loop between Northallerton and Stockton-on-Tees, 31 miles long. The York-Newcastle part is specially important, because the east coast expresses between London and Scotland travel over it, and to preserve if not improve the speed of these trains the electric locomotives will have to be capable of making 60 or 70 m.p.h.

The London & South Western Railway announced not long ago that its project of further electrification is hung up pending better times. The proposal is to extend electric traction as far out as Guildford on the main line and to convert also various country branch lines. This involves 45 miles of route, or 100 miles of track, in addition to the lines already electrified.

The Midland Railway is under an obligation to electrify its Tilbury and Southend section, some 40 miles long, but there are no immediate prospects. The Great Eastern Railway directors have spoken for years of the necessity of converting their London suburban lines, some of which carry probably the heaviest steam train passenger traffic in the world. A proposal is being made for the development of a great water power among the mountains of Scotland. Should this come about, it would probably lead to the electrification of the Highland Railway from Perth to Inverness. A possible development of a great tidal water power on the estuary of the River Severn, just suggested by the Ministry of Transport, might lead to considerable railway electrification.

BRITISH DOMINIONS LOOKING TO ELECTRIC TRACTION

The most important railway electrification work in the British dominions overseas is the conversion of the whole suburban railway system of Melbourne, Australia. These railways belong to the state, and so in spite of difficulties arising out of the war the work was gradually pushed forward. The first section began running electrically in 1919, and when all is complete the track mileage working electrically will be 335, mostly double-track, but in some places four and six-track. Direct current at 1,500 volts is used on overhead wire conductors, and multiple-unit trains are operated.

The other notable electrification is that of the Mount Royal tunnel lines in Canada, with which the readers of the ELECTRIC RAILWAY JOURNAL are familiar.

As to the future, the biggest thing in immediate prospect is the electrification of the South African State Railways. A beginning is to be made with the Cape Town-Simons Town suburban line and the section of the Natal main line from Durban to Pietermaritzburg. It is proposed to use direct current at 3,000 volts. The former line does a suburban passenger business, while the latter carries main-line traffic, both passenger and freight. Both have already reached their capacity under steam traction. The estimated cost of conversion and complete equipment of the Cape Town-Simons Town line, including a power station, is £1,269,000, while for the Natal line, including power station, locomotives, etc., the figure is £2,033,000.

Contracts have also been let for an electric railway 8 miles long, mostly in tunnel, through the mountains in the South Island of New Zealand. The line will connect the existing steam railways east and west of the mountain range. Direct current at 1,500 volts with overhead conductors will be used. The ruling gradient is 1 in 33, and the highest point on the line is 2,400 ft. above sea level.

France Planning Big Coal Saving by Electrification

Three of the Large Railway Systems Will Proceed to Adopt New Motive Power as Soon as Governmental and Financial Restrictions Are Removed

THE necessity for electrification of railways in France, while not as pressing as in some other European countries, is nevertheless receiving careful attention by the government and the Midi, Orleans and Paris-Lyons-Mediterranean railway systems. Utilization of water power, with consequent coal saving, is the primary purpose in the electrification. The whole matter is under consideration by a committee bearing the title "Comité d'études pour électrification des reseaux d'interêt géneral." This contains representatives of the six large railway systems of the country and of related industries.

GOVERNMENT ANXIOUS TO CONSERVE POWER RESOURCES

The electrification committee comprises two sub-committees, one of which was commissioned to study the plans submitted by the Midi, Orleans and P-L-M Railways, the other being especially charged to study electric traction systems in service with special reference to standardizing on a single system if possible. The latter sub-committee studied operating systems in Switzerland, Italy and the United States. Its complete report has not as yet become available, but what is understood to be its substance appeared in the *Journal Officiel* in 1919. The preference appears to be for high-voltage direct current for a unified system for France, with 50-cycle transmission.

Among other considerations leading to the preference for this particular variety of current and voltage were the fear by the government of inductive interference between railway and intelligence-transmission lines, and desire for ability to use third rail and rotary converters, thus limiting the available voltage. It is interesting to note that the French preferences in these particulars coincide with those of their British confrères.

The electrification situation in France was depicted by M. Parodi, chief engineer of electric service of the Compagnie d'Orleans in an article in the January, 1920, issue of the *Revue Generale des Chemins de fer et des Tramways*. He said that the wealth of the country in hydraulic resources, about 8,000,000 hp., will be developed as rapidly as possible. In 1913 the coal consumption was 66,000,000 tons while the production was less than two-thirds this amount. Of the total consumption the railways use nearly 8,000,000 tons. In a dozen years the deficit will probably be from 40,000,000 to 45,000,000 tons including the consumption in Alsace-Lorraine and the normal increase in requirements. By 1932 the railway consumption might reach 13,000,000 tons. The electrification of 5,100 miles of line, including the 93 miles already electrified by the Midi Railway, will reduce the coal consumption by more than 2,000,000 tons.

LARGE ELECTRIFICATION MILEAGES IN VIEW

The electrification projects which are in part now being carried out comprise the following:

The Midi system proposes to electrify 1,865 miles, constituting the whole of the system excepting the lines in the level regions around Bordeaux and Cette and the branches of these lines.

The Orleans system proposes also 1,865 miles of electrification in the Central Massis, from Chateauroux to Montauban, from Limoges to Gannat, and from Clermont to Tulle, with branches.

The Paris-Lyons-Mediterranean system proposes to electrify 1,367 miles commencing with the lines from Nimes to Langdome, from Culoz to Modane, from Lyons to Geneva, including the heavy-traffic lines from Lyons to Marseilles, from Marseilles to Vintimille, from Tarascon to Cette, etc.

During the latter part of 1920 plans for considerable electrification have received governmental sanction and the Midi Railway is reported to have placed contracts for hydraulic machinery and electric locomotives, while the Orleans Company is understood to have plans for the immediate carrying out of its program, beginning with the Paris terminal. Power for the Paris end of the system will be secured from the Paris super-power system, while the company will produce its own power hydraulically in its mountainous sections where power will probably also be available for sale.

Belgium Is a Logical Field for Electrification

This Small Country Provides a Field for a Vast Interurban Passenger System Plus One Permitting the Handling of Large Quantities of Freight

THE scheme for the electrification of the State Railways of Belgium is not so far advanced as some reports during the past year seemed to indicate. The fact is that the Belgian government is being advised by a small committee of railway engineers who are preparing a preliminary scheme which will be submitted to the commission appointed by the Belgian Government to report on the electrification of the railways. The commission consists of manufacturers, bankers, heads of railway departments and members of the various Belgian ministries, and it also includes French and British engineers. The president of the commission is Baron Ancion, and Sir Philip Dawson, so well known as a consulting electric railway engineer in England, is one of the vice-presidents. Many meetings have been held and reports made, and at present the commission is waiting for the preliminary report above referred to from the committee of engineers. No electrification contracts will be let meanwhile.

However, Belgian railways ought to be electrified promptly, for the reasons listed by Sir Philip in his Liége address abstracted in the issue of this paper for Dec. 4, 1920, page 1151. He said in this connection: "As to Belgium, in view of its relatively small area, its dense population, its frugal and industrious people, its well-developed metallurgical and other industries, its excellent railroad systems and its fuel resources, its railways can be compared with a vast suburban system. If there is a case where a complete electrification would be justified, that case presents itself in Belgium. Here it is necessary to study fundamentally the electrification of the entire system, in such a way that the sections which are to be electrified now will form a homogeneous part of the whole from the points of view both of traction and distribution. Such a study will be costly, but when millions of francs are involved it seems worth the investment of some hundreds of thousands of francs so as to insure the obtaining of the best possible financial results."

In an article appearing recently in *l'Echo de la Bourse*, Brussels, an outline of a plan for the partial electrification of the State Railways is given. It comprises three phases: (1) Complete electrification of the Brussels-Antwerp line; (2) electrification of the Luxembourg line and connections; (3) electrification of various trunk lines radiating from Brussels. For this work direct current is favored, but a decision as to voltage, 1,500 or 3,000, had not been reached at the time the article was written.

Electrification Largely Prospective in Spain

Several Excellent Opportunities for Conservation, However, Are Recognized—People Wakening to Necessity for Conserving Fuel

THE heavy traction field in Spain is practically untouched. There are, however, several prospective electrifications and the people are wakening to the necessity for increasing track capacity and conserving fuel. One of the most imminent electrifications is that of the Pajares grade on the Norte Railway in the north of Spain. This line connects the north coast at Gijon and the coal mines on the north slope of the mountains with the inland cities. The line in question is one about 39 miles long and on a grade which is 2 per cent over a large part. The line is very crooked and has many tunnels, with a maximum length of 2 miles. It is single track and the light rolling stock and light track construction make it very difficult to operate freight trains of any considerable weight; in fact, the maximum train with two locomotives is 600 metric tons. It is hoped by the electrification of this grade to make a very great increase in the capacity.

Another very important project is that of the Las Arenas Railway at Bilbao, an important seaport. This is a meter-gage railway, but has fairly heavy suburban traffic. It will probably be electrified in the near future. The railway will probably use 1,500 volts direct current, as against 3,000 volts for the Norte. The next most active prospects are at Barcelona, where there are several railways that are considering electrification seriously.

There is an abundance of water power in the north of Spain, especially at Barcelona, where there are several transmission lines with a considerable amount of power available. Barcelona is an up-to-date city and very wide awake. The inhabitants are known as the Yankees of Spain. There are one or two short electric railways there at this time, and others will soon follow.

The high cost of coal will greatly accelerate railway electrification in Spain, as well as in the other countries of Europe. The financial situation, however, is very much better, since the rate of exchange for Spain is so much better than in France and some of the other countries.

The railways of Spain seem to be, for many years at least, doomed to the use of very light trains, owing to the weak, almost flimsy, drawbar and buffer construction, as well as to the low permissible wheel loads. The cross ties in the track are spaced so far apart that the very light load of 15 tons per axle is scarcely permissible, even though an 80-lb. rail is used. The drawbars are being gradually strengthened, but it will be many years before they are able to handle as much as 20 tons pull.

Switzerland Is the Focus of Electrification Interest

Interest Centers in Lucerne-Chiasso Line, Which Includes St. Gotthard Tunnel, Now in Electric Operation—Federal Railways Have Comprehensive Program

IN OTHER countries there is much discussion of electrification; in Switzerland there is "something doing." During the past few months (since July 1) operation through the St. Gotthard tunnel has been by electric locomotives, power being drawn from the Lake Ritom hydro-electric plant in which four 12,000-hp. generator units produce power at 15,000 volts. This is part of a general program adopted over two years ago.

This country is one in which general railway electrification is a virtual necessity. The country depends upon its neighbors for coal, which now commands a prohibitive price, while it has abundant water power. Ordinarily about 600,000 tons of coal is required per annum by the railways, which can be entirely saved by the development of but a fraction of the available 3,000,000 hp. of water power. Fortunately the Swiss franc is worth in exchange nearly its par value so that the financial aspect of electrification work is not unfavorable.

A large part of the railway mileage of Switzerland (about 2,800 miles) is owned and operated by the federal government. After long study, and experience with both single-phase and three-phase, the Federal Railways in 1916 adopted 15-cycle, 15,000-volt single phase as standard, although three-phase will be retained on the Simplon tunnel line on account of its connection with the Italian lines on which three-phase is standard. The Federal Railways have adopted a program of electrification in three stages. The first includes 700 miles most favorably located for the purpose, with a corresponding hydraulic development of 76,000 hp. This will reduce the coal consumption by one-half. The second includes about 375 miles of light-traffic lines which are also favorably located, while the third includes the remainder which is left for future consideration.

To return to the St. Gotthard line; a section of the line from Lucerne to Chiasso, a distance of 140 miles. The tunnel is in electric operation, and the section from Erstfeld to Bellinzona is practically complete. On this section are grades up to 2.7 per cent. The Bellinzona-Chiasso section, connecting with the Italian lines, should be finished during 1921, and shortly thereafter the Erstfeld-Lucerne section.

During the war 33 miles of line between Brigue and Sion was temporarily equipped with three-phase, on account of the availability of power from the Simplon. It will later be made single-phase. The nearly 20 miles from Berne to Thun was also electrified with single-phase in 1918.

The Ritom power plant is of interest on account of the high head under which the Pelton impulse water wheels operate, over 2,600 ft. The depth of Lake Ritom has been increased by a 23-ft. dam, and the conduit draws off the water 100 ft. below the dam crest. The available storage capacity is estimated at 900,000,000 cu.ft., more or less.

The St. Gotthard line will also be supplied with power from a plant, now building, at Amsteg, just north of the tunnel. This is located on the Reuss River, but there will be only a small water storage capacity. The Amsteg and Ritom plants will be operated in conjunction, utilizing the different capacity characteristics of the two. The Amsteg plant will run continuously, utilizing the full capacity of the river. The Ritom plant will care for peak loads, and will in general be shut down in summer to allow the lake to fill.

Latin America Not Idle

Electrification Work Is Actually Under Way in Brazil and Cuba—Direct Current Is Employed in Both Cases

TWO interesting high-voltage direct current electrifications are being carried out at present in Brazil and Cuba; the former a part of the Paulista Railway between Jundiahy and Campinas, the latter the Hershey Cuban Railway on the north coast of the island between Matanzas and Havana.

On the Brazilian road 3,000 volts will be used on the contact line. Ten 100-ton freight and six 120-ton passenger locomotives will be installed at once on the 28 miles of route now being electrified. This is a double-track line and the single-track equivalent in the electrified zone is 76 miles.

The locomotives to be furnished by the General Electric Company are similar in general construction to those in use on the Butte, Anaconda & Pacific Railway, but with the regenerative feature. The Westinghouse locomotives differ somewhat in wheel arrangement, but essentially they are of the same general type.

The Brazilian railway officials are looking forward with keen anticipation to the arrival of the new motive power which they believe will find operating conditions congenial on this high-class, well-maintained road.

On the Hershey Cuban Railway the voltage will be only 1,200, but overhead contact construction will be used. Electric locomotives will be used for freight service, and seven 60-ton machines will furnish the initial equipment. Multiple-unit cars will be employed in the passenger service. This electrification will ultimately involve a single-track equivalent mileage of 80.

The power distribution equipment of the Hershey Cuban Railway is of interest in that for the outlying substations automatic control will be used.

Considerable popular interest attaches to the Hershey Cuban Railway in the fact that the owner is the well-known chocolate manufacturer, and a considerable part of its business consists in transporting sugar cane to Hershey Centrale, an important sugar center.

Italy Clings to Three-Phase

Although Not Oblivious to Developments in Other Systems, This Country Will Extend Electrification Along Established Lines to Avoid Delays

ITALY has for many years pursued a consistent policy of electrification, although the actual mileage of line electrically equipped is not great, say 280 miles out of a total of 8,500. However, a considerable program has been laid out, both for the state and private railways, and much construction is actually under way. The government offers subsidies to private companies for the construction of railways, with extra allowances if the lines are electrified. The subsidies have recently been increased to render them more attractive, as those previously offered were not stimulating expansion to the extent desired. Provision is made by which the state can take over the permanent way and structures of the subsidized railways under conditions which are entirely fair. On the new lines now under construction or projected about two-fifths of the mileage will be equipped for electrical operation.

The Italian State Railways have long favored three-phase locomotives, operating at 16 cycles, a very low frequency. The latest type of locomotive was commissioned during the war and gave a good account of itself. A summary of the features of this type was given in the issue of the ELECTRIC RAILWAY JOURNAL for Aug. 4, 1917, page 189. Eighteen of this type of locomotive were purchased. The locomotive is designed for four speeds up to 62 m.p.h. The four-speed arrangement was selected to provide the low speed necessary on certain parts of the lines over which the machines had to operate and to minimize the rheostatic losses in passing from speed to speed.

For power supply the railways depend largely upon the power plants of the cities near the electrified lines. The situation is complicated by the low frequency of the railway power, the industrial frequency being 42 cycles. Where a power plant furnishes railway power it must have extra generators, which are sometimes mounted on the same shafts as the industrial machines. Frequency changers are apparently not used. Experiments will be conducted by the State Railways with 42-cycle current for use on the locomotives and also with the high-voltage direct current.

However, the program will be carried out as planned using three-phase and it is understood that 1,200 miles of line or more will be electrified in the near future.

The plan for electrification, as presented by the Railway Administration to the Minister of Public Works, was reported by Vice-Consul James J. Murphy, Jr., from Genoa, and printed in *Commerce Reports* for Sept. 3, 1920, page 1098.

It covers four groups as follows:

1. Lines to be electrified at once by the Railway Administration: Ovada to Sampierdarena, Genoa to Spezia, Florence to Pistoia to Bologna, Bologna to Faenza to Florence, Orte to Foligno, Rome to Naples with branches Carano to Nettuno and Piperno to Terrarina, Naples to Avezzano to Sulmona, Naples to Salerno to Gragnano, Savona to Altare to San Guiseppe, Brenner to Verona, Trieste to Piedirolde with branch Prevancina to Aidustera, Chiasso to Monza to Milan. The length of the above totals nearly 830 miles.

2. Lines to be electrified as above but in the second period: Alessandria to Ovada, Spezia to Pisa, Spezia to Parma, Florence to Orte to Rome, Foligno to Falconara

to Faenza, Sulmona to Pescara to Falconara, Cesa to Mondovi to Forsano to Trofarello, Trieste to Monfalcone with branch to Nabresina Operina, Milan to Voghera. Total length of these lines, nearly 700 miles.

3. Lines on which new systems of electric traction will be tried: Rome to Anzio, Rome to Tivoli (3-phase with industrial frequency); Messina to Catania (high-voltage direct current); Cagliari to Monteponi (standard-voltage direct current). The combined length of these lines is about 160 miles.

4. Lines which will be electrified under private management: Savona to Ventimiglia, Turin to Venice, Milan to Bologna to Padua, Bologna to Vernona, Mestre to Primolano to Trent, Florence to Pisa, Benevento to Salerno, Benevento to Foggia, Salerno to Battipaglia to Paola, Mestre to Portogruaro to Monfalcone. The lines have a total length of about 1,080 miles.

The grand total of all of the above lines is nearly 2,770 miles.

The plan comprehends that the lines south of the Pisa-Florence-Faenza line in the first and second groups will comprise power plants that can be operated at a frequency higher than 16 cycles in case the Rome-Anzio experiment with industrial frequency is a success.

American Engineering Council at Work

Active Steps Taken to Assume Work that Was Started by Engineering Council — Non-Member Societies Will Be Asked to Co-operate

HERBERT HOOVER, president of the Federated American Engineering Societies, presided at the executive board meeting of the American Engineering Council of that organization, held in New York on Friday, Dec. 17. Every one of the twenty-four members of the council was present with the exception of A. M. Greene.

The president appointed the following standing committees:

Procedure

Calvert Townley, chairman
Herbert Hoover, ex officio
W. E. Rolfe
D. S. Kimball
J. Parke Channing
L. W. Wallace
L. P. Alford

Constitution and By-Laws

W. B. Powell, chairman
C. F. Scott
D. S. Kimball

Publicity and Publications

L. P. Alford, chairman
H. W. Buck
H. E. Howe

Membership and Representation

J. F. Oberlin, chairman
L. W. Wallace
A. S. Dwight

Finance

William McClellan, chairman
E. Ludlow
C. Townley
L. W. Wallace, ex officio

Public Affairs

J. Parke Channing, chairman
Fred J. Miller
L. B. Stillwell

In discussing the program of the council immediately ahead, Mr. Hoover stated that he had called engineers together in various cities he had visited lately and that he found that the general desire of engineers everywhere was to join in the federation movement, but that the general trend was for territorial organization, as distinguished from national organization. One of the stumbling blocks in the way of these territorial organizations joining the national organizations was the question of dues. Another complexity was that individuals hold memberships in more than one society. This question was discussed and referred to a special committee, which will include the six district delegates.

As a step forward in co-ordinating various inter-society activities already established, the necessary action was taken to make it possible for certain of the activities of Engineering Council to be taken over by the new organization. As soon as the United Engineering Societies have passed officially upon the proposed action of Engineering Council to transfer and continue the work of Engineering Council's committees which have not yet completed their work the president will appoint the necessary committees of American Engineering Council to take over this work. At the meeting of Engineering Council held in Washington, there was harmony of all the member societies in Engineering Council to this end. In this connection, action was taken to amend the by-laws so that members of committees can be selected from societies other than those at present members of the federation. Civil engineers and engineers in other bodies not at present affiliated with the Federated American Engineering Societies can, because of this action, co-operate in the committee work.

The four so-called founder societies in addition have been associated in a common employment service and American Engineering Council has offered to take over this service as a part of its function.

American Engineering Council voted not to affiliate with the United States Chamber of Commerce, but it expressed its desire to co-operate with the Chamber at any time and give advice on any question that may arise. It was the thought of the meeting that the council could make its best contribution to the public by acting independently.

The council authorized the appropriation of $1,000 as an initial fund to carry on publicity work, and the committee on publicity and publications was given authority to set up a board of engineering editors.

A special committee reported on candidates for permanent executive secretary of the organization, but no final action was taken at the meeting.

There was a general feeling expressed that the meetings of the board should be held at different centers, and the place of the next meeting, which will be held Feb. 11, was left to the discretion of the president.

Safety Car Recommended to English Tramway Managers

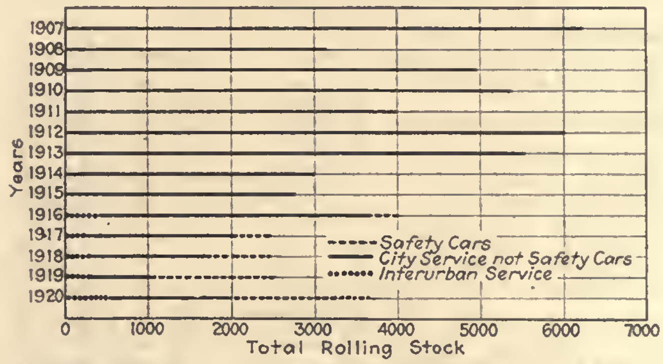
TO ENGLISH tramway managers the *Electric Railway and Tramway Journal* of Nov. 12, 1920, recommends for earnest consideration J. C. Thirlwall's article on the safety car which appeared in the ELECTRIC RAILWAY JOURNAL of Oct. 2, 1920. It points out the fact that in spite of the distinct success and popularity in this country of one-man cars not a single British system has considered their adoption even as a partial solution of operating difficulties. Their backwardness in failing to realize the economies resulting from their lightness and one-man operation can be attributed, perhaps, to their ultra-conservatism. However, it cannot be overlooked that circumstances which are necessary for the success of the safety car may not be existent in England yet and their wide use here does not give proof of their permanent utility.

New Rolling Stock Ordered in 1920

Approximately 50 per Cent More Cars Ordered than During the Year Previous—Safety Cars Still Represent the Largest Proportion of the Total, 113 Companies Ordering 1,699 Safety Cars—Both Urban and Interurban Passenger Cars Increase by Large Percentages—Freight and Express Cars Nearly Treble

THE statistics in the following tables regarding new cars and locomotives ordered during 1920 by the electric railway companies of the United States and Canada indicate the need on many lines for additional equipment to care for existing traffic. A step was made last year to acquire additional rolling stock. In 1919 the new rolling stock ordered was 2,447 cars. The results this year show a much more promising future, since the new cars and locomotives ordered have reached a total of 3,598 cars, which is 1,151 more than last year, or a percentage increase of 47.5 per cent.

The main reason for this large increase in car orders is due to the more extensive use of the one-man car. Many companies, and especially is this true west of the Mississippi River, are supplanting their equipment with these lighter cars, which are less expensive to operate and to maintain. Although many companies which had previously ordered one-man cars enlarged their equipment by the purchase of more, the number of new companies ordering them is very noticeable. The number of companies this year which invested in this type of car is 113.



NEW CARS AND LOCOMOTIVES ORDERED BY YEARS

In this chart the division by city and interurban cars is not made prior to 1916.

These 113 companies, which are approximately 13.5 per cent of all those in the United States and Canada, purchased 1,699 one-man cars. This is quite a gain over last year and may be assumed to prove the fact that the light weight one-man car has been able to compete with the jitney. As is shown in the chart accompanying this article, the light weight one-man cars were practically unknown until 1916, when only 187 of these cars were ordered. The number ordered during 1920 is nearly ten times as many as in 1916. Most of the one-man cars were ordered in the United States, only thirty of the total being ordered by Canadian companies. The types of cars are divided into motor or trailer, two-man passenger, city or interurban, and freight and express cars, city or interurban, besides the one-man cars. Of the total number the latter occupy the most prominent position, with a total of 1,699 cars, or approximately 47.5 per cent of all the cars ordered during the past year. While the percentage of one-man cars to the total is 9 per cent less than in 1919, this fact does not characterize the growth as much as the actual increase of 316 cars.

TABLE I—NEW ROLLING STOCK ORDERED SINCE 1907

Year	Passenger Cars City	Passenger Cars Interurban	Freight and Misc Cars	Electric Locomotives	Total
1907	3,483	1,327	1,406	(a)	6,216
1908	2,208	727	176	(a)	3,111
1909	2,537	1,245	1,175	(a)	4,957
1910	3,571	990	820	(a)	5,381
1911	2,884	626	605	(a)	4,015
1912	4,531	783	687	(a)	6,001
1913	3,820	547	1,147	(a)	5,514
1914	2,147	384	479	(a)	3,010
1915	2,072	336	374	(a)	2,782
1916	3,046	374	491	31	3,942
1917	1,998	185	223	49	2,455
1918	1,842	255	278	44	2,419
1919	2,129	128	172	18	2,447
1920	2,889	227	465	17	3,598

(a) Included in "Freight and Miscellaneous Cars."

In order to show the progress of the industry at a glance a table has been prepared showing the rolling stock ordered each year since 1907, divided into four types of cars: passenger cars, city or interurban; freight, express and miscellaneous cars, and electric locomotives. In this table passenger cars for operation in subway and on elevated structures have been taken as city passenger cars. The miscellaneous cars include service cars, as snow plows, sweepers, work cars, etc.

Due to the large increase in safety cars, which all come under the head of city passenger cars, an increase of 39 per cent will be noted in this column. At the same time the total of each of the other types of cars has likewise increased except in the use of the electric locomotives.

The electrification of steam railroads was at a standstill during 1920. An indication of this was the fact that only seventeen new electric locomotives were ordered during the year, and further, that these were mostly ordered by electric railways for switching purposes or the haulage of freight cars.

In the gathering of the data for this article questionnaires were sent to about 785 electric railway companies in the United States and replies were received from about 91 per cent of them. The remaining 9 per cent are small companies.

TABLE II—SPECIAL COMPARISONS OF NEW ROLLING STOCK ORDERED

	1920	1919	1918	1917	1916
Number of railways reporting new cars	172	160	140	182	250
Total number of cars	3,581	2,429	2,375	2,406	3,911
City Service:					
Number of safety cars	1,699	1,383	644	280	187
Number of two-man passenger motor cars*	847	635	1,068	1,316	2,731
Number of passenger trailers	343	111	130	402	128
Service cars	104	31	(a)	(a)	(a)
Total city service cars	2,993	2,160	1,842	1,998	3,046
Interurban Service:					
Number of two-man passenger motor cars	195	96	200	158	303
Number of passenger trailers	32	32	55	27	71
Number of freight and express cars	361	141	(a)	(a)	(a)
Total interurban service cars	588	269	255	185	374
Number of electric locomotives	17	18	44	49	31
Number of cars and electric locomotives built in railway companies' shops	166	165	89	281	445

*Includes motor and trailer cars for subway and elevated in New York City.
(a) Not available.

TABLE III—ROLLING STOCK ORDERED DURING 1920

New England District

	Number	Type	Over-all Length	City or Interurban	Motor or Trailer
Connecticut:					
Bristol & Plainville Tramway Co.	3	Passenger	39′ 0″	C	M
Connecticut Co. (New Haven)....	20	Safety	28′ 0″	C	M
	30	Safety	27′ 10″	C	M
	6	Safety	28′ 0½″	C	M
Danbury & Bethel St. Ry.......	4	Safety	39′ 0″	C	M
Maine:					
Androscoggin & Kennebec Ry. Co., Lewiston................	3	Safety	28′ 0″	C	M
	10	Passenger	45′ 0″	C	M
	* 2	Snow plow	25′ 0″	C & I	M
Biddeford & Saco R.R. Co.......	2	Safety	28′ 0″	C	M
Cumberland County Pwr. & Lt. Co., Portland................	8	Safety	28′ 0″	C	M
	1	Snow plow	30′ 0″	I	M
	1	Snow swpr.	24′ 10″	C	M
Knox County Electric Co., Rockland.......................	1	Passenger	28′ 0″	C	T
	1	Passenger	49′ 9″	C	M
	1	Passenger	43′ 0″	I	M
Massachusetts:					
Berkshire St. Ry. Co., Pittsfield...	12	Safety	28′ 0″	C	M
Boston Elevated Railway Co.....	30	Passenger	48′ 9¼″	C	M
	65	Passenger	46′ 7¼″	C	M
	75	Passenger	48′ 2½″	C	M
	80	Safety	28′ 0½″	C	M
	2	Snow plow	42′ 4″	C	M
	2	Snow swpr.	39′ 0″	C	M
	*1	Line car	36′ 6″	C	M
Boston & Worcester St. Ry.......	1	Safety	27′ 10″	C	M
Brockton & Plymouth St. Ry. Co.	3	Safety	28′ 0″	C	M
City of Attleboro...............	1	Safety	27′ 10″	C	M
Eastern Mass. St. Ry. Co.........	50	Safety	28′ 0½″	C	M
	29	Snow swpr.	....	C	M
Northampton St. Ry............	2	Snow swpr.	....	C	M
Springfield St. Ry. Co...........	10	Safety	28′ 0″	C	M
New Hampshire:					
Laconia St. Ry. Co.............	2	Safety	28′ 0″	C	M
Rhode Island:					
Newport & Providence Ry. Co...	2	Safety	28′ 0″	C	M
Vermont:					
Barre & Montpelier Trac. & Pwr. Co.........................	2	Safety	28′ 0″	C	M

North of the Ohio and East of the Mississippi River

	Number	Type	Over-all Length	City or Interurban	Motor or Trailer
District of Columbia:					
Washington & Old Dominion Ry.	*1	Passenger	40′ 0″	I	M
Illinois:					
Aurora, Plainfield & Joliet Ry....	1	Safety	28′ 0″	C	M
Chicago Surface Lines...........	10	Safety	28′ 0½″	C	M
	*51	Passenger	47′ 6″	C	T
	6	Snow swpr.	28′ 3″	C	M
Decatur Ry. & Lt. Co...........	6	Safety	28′ 0½″	C	M
Illinois Traction Co. (Peoria)....	40	Safety	28′ 0½″	C	M
Pekin Municipal Ry. Co........	3	Safety	28′ 0″	C	M
Rockford & Interurban Ry. Co. .	12	Safety	28′ 0″	C	M
	1	Snow swpr.	....	C	M
Springfield Consolidated Ry. Co.	17	Safety	28′ 0″	C	M
Indiana:					
Gary & Hobart Traction Co.....	1	Safety	28′ 0″	C	M
Indiana Rys. & Lt. Co. (Kokomo)	10	Safety	28′ 0½″	C	M
	2	Passenger	45′ 0″	I	T
	3	Work	24′ 0″	I	T
Indiana Service Corportion (Fort Wayne).....................	4	Freight	40′ 0″	I	T
Interstate Public Service Co.....	8	Passenger	62′ 0″	I	M
	1	Passenger	50′ 0″	I	T
	15	Freight	42′ 1″	I	T
Public Utilities Co. (Evansville) . .	8	Safety	28′ 0″	C	M
Terre Haute, Indianapolis & Eastern Trac. Co................	10	Safety	28′ 0½″	C	M
Winona Interurban Ry. Co. (Warsaw).....................	* 6	Freight	36′ 0″	I	T
Maryland:					
Cumberland & Westernport Ry. (Frostburg).................	1	Bag. & exp.	41′ 8″	I	M
United Rys. & Elec. Co. of Baltimore.....................	100	Passenger	46′ 10″	C	T
	33	Safety	28′ 0½″	C	M
Michigan:					
City of Detroit Municipal Ry.....	25	Safety	27′ 10″	C	M
Detroit United Rys............	12	Safety	28′ 0½″	C	M
	1	Freight	50′ 0″	I	M
Escanaba Trac. Co.............	2	Passenger	45′ 0″	I	M
	1	Snow swpr.	28′ 6″	I	M
Grand Rapids Ry. Co...........	19	Safety	28′ 0½″	C	M
Michigan Railroad Co. (Jackson)	20	Freight	50′ 0″	I	M
Michigan Rys. Co. (Kalamazoo). .	8	Safety	27′ 9½″	C	M
Michigan United Rys. Co. (Jackson)......................	20	Safety	28′ 0½″	C	M
Muskegon Trac. & Lt. Co........	6	Safety	28′ 0½″	C	M
Saginaw Bay City Ry. Co.......	8	Safety	28′ 0″	C	M
	20	Safety	28′ 0½″	C	M
	1	Sweeper	....	C	M
New Jersey:					
Pennsylvania—New Jersey Ry. Co. (Trenton)...............	7	Safety	35′ 4″	C	M
Public Service Ry.Corp.(Newark)	200	Safety	27′ 10″	C	M
	100	Passenger	49′ 9″	C	T
	15	Snow swpr.	30′ 6″	C & I	M
	15	Snow plow	40′ 8″	C & I	M
Salem & Pennsgrove Trac. Co....	6	Safety	28″ 0½″	C	M
Trenton & Mercer County Trac. Co.........................	40	Safety	28′ 0½″	C	M
New York:					
Binghamton Ry. Co............	‡10	Passenger	47′ 0″	C	M
City of New York Municipal Ry. .	28	Safety	28′ 0½″	C	M
Empire State Railway Co.......	6	Safety	27′ 10″	C	M
	3	Passenger	53′ 7″	I	M
Hudson Valley Railway Co. (Glens Falls).................	2	Passenger	50′ 0″	I	M
Manhattan Bridge 3c. Line......	2	Passenger	44′ 6″	C	M
New York Central R.R.........	15	Passenger	69′ 5″	I	M
New York Municipal Ry. Corp. .	200	Passenger	67′ 0″	C	M
Orange County Trac. Co. (Newburgh)......................	3	Safety	28′ 0½″	C	M
Peekskill Lt. & R.R. Co.........	2	Safety	28′ 0″	C	M
	4	Safety	27′ 9½″	C	M
Poughkeepsie & Wappingers Falls Ry.......................	7	Safety	27′ 10″	C	M
Rochester, Lockport & Buffalo R.R. Corp.................	1	Express	....	I	M
	1	Snow plow	....	C	M
Westchester St. R.R. Co. (White Plains)...................	6	Safety	27′ 10″	C	M
Ohio:					
Cleveland Railway Co..........	50	Passenger	52′ 5½″	C	M
	50	Passenger	49′ 2″	C	T
Columbus, Delaware & Marion Elec. Co.....................	5	Freight	42′ 0″	I	M
Dayton & Troy Electric Ry. Co...	8	Passenger	62′ 5″	I	M
Lake Shore Electric Ry. (Cleveland)......................	16	Safety	28′ 0″	C	M
	15	Freight	55′ 0″	I	T
Northern Ohio Trac. & Lt. Co. (Akron)....................	25	Passenger	50′ 0¼″	C	M
	31	Passenger	50′ 0¼″	I	M
	10	Passenger	46′ 8¾″	C	T
	20	Passenger	55′ 11″	I	M
	25	Safety	28′ 0½″	C	M
	3	Snow swpr.	28′ 2″	C	M
Ohio Service Co. (Coshocton).....	2	Safety	28′ 0½″	C	M
Pennsylvania-Ohio Electric Co. (Youngstown)..............	10	Passenger	52′ 11½″	I	M
	12	Safety	28′ 0½″	C	M
Southeastern Ohio Ry. Co. (Zanesville).................	1	Passenger	48′ 2″	I	M
Toledo, Fostoria & Findlay Ry. Co.........................	1	Freight	58′ 0″	I	M
Pennsylvania:					
Beaver Valley Trac. Co..........	10	Safety	27′ 10″	C	M
Chambersburg, Greencastle & Waynesboro St. Ry...........	1	Passenger	48′ 0″	I	M
Conestoga Trac. Co. (Lancaster)..	2	Passenger	45′ 0″	I	M
	4	Safety	30′ 0″	C	M
	1	Express	41′ 8″	I	M
Eastern Pennsylvania Rys.(Pottsville).....................	10	Safety	28′ 0½″	C	M
	2	Passenger	47′ 0″	I	M
Ephrata & Lebanon St. Ry. Co...	1	Express	50′ 0″	I	M
Harrisburg Railways Co.........	2	Snow swpr.	28′ 3″	C	M
Hershey Transit Co.............	2	Passenger	41′ 8″	I	M
Indiana County St. Ry. Co. (Indiana).....................	*3	Passenger	44′ 5″	I	M
Northumberland County Ry. (Sunbury)...................	4	Safety	28′ 0½″	C	M
Pittsburgh Rys. Co.............	25	Passenger	45′ 0″	C	T
Reading Transit & Lt. Co........	25	Passenger	45′ 0″	C	M
	12	Safety	27′ 10″	C	M
	1	Dump	40′ 6″	C	M
Shamokin & Mt. Carmel Transit Co........................	2	Safety	28′ 0½″	C	M
State Belt Transit Co. (Pen Argyl)	2	Passenger	47′ 0″	I	M
Susquehanna Trac. Co. (Lock Haven).....................	1	Safety	27′ 9½″	C	M
	1	Snow swpr.	28′ 3″	C	M
Tarentum, Breckenridge & Butler Ry.......................	1	Safety	28′ 0½″	C	M
Trenton, Bristol & Phila. St. Ry. Co........................	6	Safety	28′ 0½″	C	M
Warren Street Railway..........	6	Safety	28′ 0½″	C	M
	2	Passenger	41′ 8″	I	M
	1	Snow swpr.	....	C	M
Westmoreland County Ry. (Pittsburgh)...................	4	Safety	28′ 0½″	C	M
West Penn Railways...........	*2	Express	59′ 0″	I	M
	*2	Dump	20′ 0″	I	T
Wilkes-Barre Ry. Co............	5	Passenger	48′ 0″	I	M
Woodlawn & Southern St. Ry. Co.	4	Safety	28′ 0½″	C	M
York Railways................	6	Passenger	45′ 0″	I	M
	1	Swpr.	29′ 0″	C	M
Wisconsin:					
Beloit Traction Co.............	2	Safety	28′ 0½″	C	M
Janesville Traction Co..........	5	Safety	28′ 0″	C	M
Madison Railways Co...........	8	Safety	30′ 0″	C	M
Milwaukee Elec. Ry. & Lt. Co..	40	Safety	28′ 0″	C	M
	100	One man	45′ 0″	C	M
	*2	Express	50′ 0″	I	M
	*2	Express	50′ 0″	I	T
	4	Dump.	40′ 6″	C & I	M
	8	Dump	40′ 6″	C & I	T
	4	Dump.	21′ 6″	C & I	T
	*6	Work	....	C & I	T
	8	Other types	....	C & I	T
Wisconsin Public Service Co. (Green Bay)................	6	Safety	28′ 0″	C	M
Wisconsin Valley Elec. Co. (Wausau).....................	4	Safety	28′ 0½″	C	M

South of the Ohio and East of the Mississippi River

	Number	Type	Over-all Length	City or Interurban	Motor or Trailer
Alabama:					
Alabama Pwr. Co. (Birmingham).	4	Safety	28′ 0½″	C	M
Mobile Lt. & R R. Co..........	2	Safety	28′ 0½″	C	M
	10	Safety	27′ 9½″	C	M
Montgomery Lt. & Trac. Co.....	10	Safety	28′ 0″	C	M
Tuscaloosa Ry. & Utilities Co....	*1	Passenger	22′ 6″		

* Built in companies' own shops. † Rebuilt. ‡ Second hand.

TABLE III—ROLLING STOCK ORDERED DURING 1920—*CONTINUED*

	Number	Type	Over-all Length	City or Interurban	Motor or Trailer
Florida:					
Municipal Railways of St. Petersburg	8	Safety	27′ 9½″	C	M
Tampa Electric Co	8	Safety	28′ 0½″	C	M
Georgia:					
Athens Ry. & Elec. Co	5	Safety	28′ 0½″	C	M
Atlanta Northern Ry. Co	4	Passenger	50′ 6″	I	M
Columbus Railroad Co	9	Safety	28′ 0½″	C	M
Georgia Ry. & Pwr. Co	23	Passenger	44′ 6″	C	M
North Carolina:					
Tidewater Power Co. (Wilmington)	10	Safety	28′ 0½″	C	M
South Carolina:					
Southern Public Utilities Co. (Anderson)	6	Safety	28′ 0″	C	M
Virginia:					
Danville Trac. & Pwr. Co	2	Passenger	37′ 0″	C	M
Virginia Ry. & Pwr. Co. (Richmond)	50	Safety	28′ 0½″	C	M
West Virginia:					
Monongahela Valley Trac. Co. (Fairmont)	8	Safety	28′ 9½″	C	M
	3	*Freight	30′ 0″	I	M
West of the Mississippi River					
California:					
Fresno Traction Co	12	Safety	28′ 0″	C	M
Los Angeles Railway Co	22	Safety	28′ 0″	C	M
Municipal Ry. of San Francisco	1	Passenger	29′ 0″	C	M
Pacific Elec. Ry. (Los Angeles	102	Safety	28′ 0½″	C	M
	26	Passenger	47′ 0″	I	M
	16	Passenger	47′ 0′	I	T
Pacific Gas & Elec. Co. (Sacramento)	6	Safety	28′ 0½″	C	M
San Diego Electric Railway Co	25	Safety	28′ 0½″	C	M
San Francisco, Napa & Calistoga Railway	2	Passenger	58′ 0″	I	M
	* 1	Passenger	35′ 0″	I	M
San Francisco-Oakland Term. Rys.	25	Safety	28′ 0½″	C	M
	*18	Passenger	48′ 6″	C	M
	* 5	Passenger	40′ 8″	I	M
San Jose Railroads	22	Safety	28′ 0″	C	M
Stockton Electric Railroad Co	15	Safety	28′ 0″	C	M
Colorado:					
Arkansas Valley Railway, Light & Power Co. (Pueblo)	4	Safety	27′ 9½″	C	M
Iowa:					
Iowa Ry. & Lt. Co. (Cedar Rapids)	6	Safety	28′ 0½″	C	M
Iowa Southern Utilities Co. (Centerville)	1	Safety	....	C	M
Waterloo, Cedar Falls & Northern Ry. Co	20	Safety	28′ 0½″	C	M
Kansas:					
Topeka Railway Co	8	Safety	28′ 0½″	C	M
Louisiana:					
Baton Rouge Electric Co	8	Safety	28′ 0″	C	M
Shreveport Railways Co	*3	Passenger	40′ 8″	C	M
Minnesota:					
Wisconsin Railway, Light & Power Co. (Winona)	8	Safety	28′ 0″	C	M
Missouri:					
Kansas City, Clay County & St. Joseph Ry. Co	* 1	Freight	42′ 0″	I	M
	3	Passenger	51′ 5″	I	M
United Railways of St. Louis	10	Safety	28′ 0½″	C	M
	50	Passenger	45′ 0″	C	M
	*51	Passenger	50′ 6″	C	M
	* 1	Work	40′ 0″	C	M
Nebraska:					
Lincoln Traction Co	15	Safety	28′ 0½″	C	M
Omaha & Council Bluff St. Ry	5	Safety	28′ 0½″	C	M
	2	Snow Swpr.	29′ 0″	C	M
Omaha, Lincoln, & Beatrice Railway Co	2	Passenger	42′ 0″	C	M
	1	Passenger	30′ 0″	C	M
North Dakota:					
Grand Forks St. Railway Co	6	Safety	27′ 9½″	C	M
Northern States Power Co. (Fargo)	15	Safety	27′ 9½″	C	M
Oklahoma:					
Pittsburgh County Railway Co. (McAlester)	2	Passenger	43′ 7″	I	M
Oregon:					
Oregon & California Railroad (Salem)	4	Safety	28′ 0½″	C	M
Pacific Pwr. & Lt. Co. (Astoria)	1	Safety	28′ 0½″	C	M
Southern Pacific Co. (Portland)	4	Safety	28′ 0″	C	M
	6	Passenger	55′ 10″	I	M
	6	Passenger	55′ 10″	I	T
South Dakota:					
Sioux Falls Traction System	3	Safety	28′ 0½″	C	M
Texas:					
Austin Street Railway Co	10	Safety	28′ 0½″	C	M
Dallas Railway Co	50	Safety	28′ 0½″	C	M
El Paso Electric Railway Co	10	Safety	28′ 0½″	C	M
Houston Electric Co	15	Safety	28′ 0½″	C	M
Northern Texas Traction Co. (Fort Worth)	4	Passenger	52′ 0″	I	M
	35	Safety	28′ 0½″	C	M
San Antonio Public Service Co	15	Safety	28′ 0½″	C	M
Texas Electric Ry. Co. (Dallas)	4	Passenger	56′ 0″	I	
Utah:					
Bamberger Electric R. R.*	1	Passenger	58′ 0″	I	M
	5	Passenger	58′ 0″	I	T
	1	Express	58′ 0′	I	M
	1	Express	42′ 0″	I	T
Salt Lake & Utah Railroad Co	10	Freight, Box	36′ 10½″	I	T
	50	Freight, Gondola	41′ 9½″	I	T
Utah-Idaho Central R. R. Co	100	Freight	46′ 2½″	I	T
Washington:					
Pacific Northwest Traction Co	‡4	Freight	41′ 0″	I	M
Puget Sound Power & Light Co. (Bellingham)	8	Safety	28′ 0½″	C	M
Canada:					
Brantford Municipal Ry., (Ont)	2	Safety	32′ 0″	C	M
Grand River Railway Co. (Ont.)	7	Passenger	61′ 6″	I	M
	1	Express	61′ 6″	I	M
Hydro-Electric Power Commission (Ont.)	2	Passenger	36′ 0	C	M
	12	Passenger	33′ 0″	C	M
	6	Passenger	33′ 0″	C	T
	2	Snow Swpr.	33′ 0″	C	M
Lake Erie & Northern Railway Co., (Ont.)	3	Passenger	61′ 8″	I	M
	1	Passenger	61′ 8″	I	T
Sherbrooke Ry. & Pwr. Co. (Que.)	2	Safety	30′ 0″	C	M
Southern Canada Power Co	1	Safety	28′ 0½″	C	M
Toronto Civic Railway (Ont.)	25	Safety	28′ 0½″	C	M
Toronto Suburban Railway (Ont.)	2	Express	52′ 0″	I	M
Winnipeg Electric Ry. Co., (Man.)	6	Snow Swpr.	28′ 0″	C	M

* Built in companies' own shops. † Rebuilt. ‡ Second hand.

ELECTRIC LOCOMOTIVES

	Number	Weight Tons.	Length Over All, Ft.	In.
New England District:				
Rutland Railway, Light & Power Co	1	..	..	..
North of the Ohio and East of the Mississippi River:				
Metropolitan West Side Elev. Ry. Co. (Ill.)	2	50	37	4
Albany Southern Railroad Co. (N. Y.)	1	..	46	6
Brooklyn Rapid Transit Co. (N. Y.)	1	..	35	6
Youngstown & Suburban Railway Co. (Ohio)	1	45	..	..
Monongahela Valley Traction Co	1	..	34	0
Washington & Old Dominion Ry	1	..	34	4½
West of the Mississippi River:				
Bamberger Electric R.R. Co	1	..	42	0
Pacific Electric Railway	2	60	..	..
Tidewater Southern Railway (Cal.)	1	60	..	..
Salt Lake & Utah Railroad Co (Utah)	3	..	31	2½
Canada:				
Grand River Railway Co	1	..	36	0
Lake Erie & Northern Railway Co	1	..	36	0

A more detailed description of the cars ordered during the last five years is found in Table II. Referring to this table it will be noted that the railways are approaching the same number of cars as were purchased in 1916, when 3,900 cars were ordered. The rolling stock built by electric railways in their own shops has also held its own this year, having increased by only one car. The companies which built a large part of their own cars this year were the United Railways of St. Louis, which built 51 motor passenger cars, and the Chicago Surface Lines, which equaled St. Louis by constructing the same number, except that they were trailer cars.

Among the larger orders for cars this year were

TABLE IV—RECAPITULATION OF CARS AND LOCOMOTIVES ORDERED—1920

	New England District	North of the Ohio and East of the Mississippi River	South of the Ohio and East of the Mississippi River	West of the Mississippi River	Total United States	Canada	Cuba	Total
Number of companies reporting	20	85	15	45	165	9	1	175
Total cars and electric locomotives ordered	449	1,937	161	927	3,474	74	50	3,598
City Service:								
Safety cars	246	852	128	443	1,669	30	..	1,699
Passenger cars Motor	184	448	25	126	783	14	50	847
Passenger cars Trailer	1	336	...	...	337	6	..	343
Service cars	15	78	...	3	96	8	..	104
Total city cars	446	1,714	153	572	2,885	58	50	2,993
Interurban Service:								
Passenger cars Motor	1	125	5	54	185	10	..	195
Passenger cars Trailer	...	4	...	27	31	1	..	32
Express and freight cars	1	87	3	267	358	3	..	361
Total interurban cars	2	217	8	348	574	14	..	588
Electric locomotives	1	7	...	7	15	2	..	17
Number of companies ordering safety cars	15	51	11	32	109	4	..	113

200 steel motor cars for the Brooklyn Rapid Transit Subway System. The first 100 of these were ordered in May and the second 100 in December, 1920. The Public Service Corporation of New Jersey placed an order for 200 safety cars and 100 trailer passenger cars 49 ft. 9 in. long. The Milwaukee Electric Railway & Light Company ordered 100 motor cars, 45 ft. long, that can be operated either by one or two men. In Baltimore the United Railways & Electric Company ordered 100 passenger trailer cars. The use of the trailer car seems to be increasing rapidly. Besides the two orders already mentioned, the Cleveland Railway ordered fifty motor and fifty trailer passenger cars.

Table I shows the details of the rolling stock ordered by the individual companies. The companies are alphabetically arranged by states and the states are grouped into districts. The cars ordered by the companies listed under the territory "North of the Ohio and East of the Mississippi River" were by far the greatest, the number being 1,947 cars, which is 54 per cent of the total rolling stock ordered.

All cars are specified as to the service for which they are intended. No attempt has been made to give details as to construction other than the over-all length. Most of the cars are either of semi-steel or all-steel construction. The day of the wooden car is past, except for freight, express or service cars.

It is practically impossible to receive replies from all electric railway companies when a definite date is set for publication. Answers to questionnaires were received from more than 700 railway companies and have been supplemented by notes previously published.

Through the courtesy and co-operation of the car builders it has been possible to check these figures furnished by the railway companies, and in some cases where the companies have failed to report the figures as furnished by the car manufacturers have been used. Hence it is believed that few cases of cars built during the year have been missed.

The ELECTRIC RAILWAY JOURNAL wishes to thank all those who co-operated in making possible the publication of this information.

Track Extensions and Reconstruction

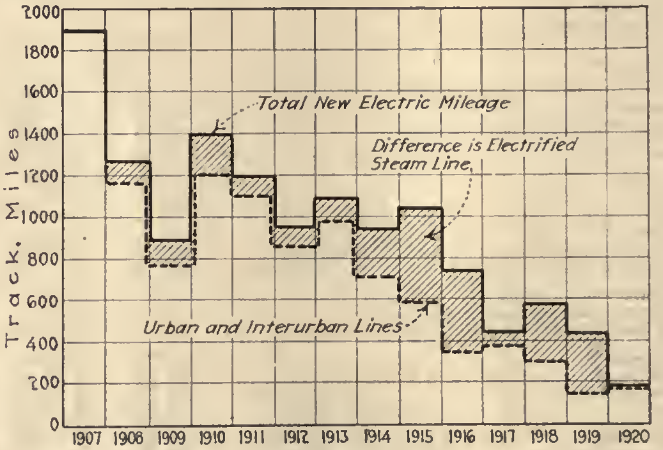
One Hundred and Sixty-five Urban and Interurban Railway Companies Report on Track Construction—87 Built 185 Miles of Extensions and 131 Companies Reconstructed 361 Miles of Track During Past Year—Only 9 Miles of Steam Road Were Electrified — More New Track Was Built, But Less Track Was Reconstructed than Last Year

THE outlook for the electric railways in the future seems to be very favorable if the figures showing track extensions and track rebuilt by the companies during 1920 may be taken as any indication. In 1919 the track extensions were the lowest that had ever been encountered for at least fourteen years, as the summary "Comparison of Track Construction" illustrates. The number of miles of track extensions during 1920 was 185.48, and although this does not approach very closely the figure of 1918 it is at least a step in that direction. This new track represents an increase over 1919 of 36 miles in the urban and interurban lines, or an increase of 25.6 per cent.

The fact that the electrified steam railroads constructed very little track compared with last year makes the comparison of the total seem worse. According to all reports that can be found, the track that was extended by the electrified steam lines was less than 10 miles, while in 1919 for the same item 287 miles were reported.

Of the total mileage of track extensions constructed by city or interurban electric railways nearly one-third was built in New York City, the Interborough Rapid Transit Company having extended its subway mileage by 38.84 miles, while its competitor, the New York Municipal Railway Corporation, was building 14 miles of new track.

The track rebuilt has not come up to the total of last year, but this figure has not deviated enough from 1919 to mention the difference. The price of rails was so high that the electric railways have not replaced any track except where it was absolutely necessary to do so. Both the extensions and the rebuilt track seem to show that it has been the policy not to extend or rebuild any track unless required by city paving contracts or where absolutely necessary on account of traffic conditions.



THIS CHART SHOWS MILES OF NEW TRACK BUILT EACH YEAR SINCE 1907

In the accompanying table is given the single-track mileage built by urban and interurban railways during 1920. This table was prepared from questionnaires which were sent to approximately 800 companies and which were returned by more than 700. The majority

COMPARISON OF TRACK CONSTRUCTION

Year	Extensions					
	No. of Cos.	Urban Track	Interurban Track	Electrified Steam Lines	Total	Track Rebuilt
1907	(a)	(a)	(a)	......	1,880.00	(a)
1908	157	1,174.5		84.00	1,258.50	(a)
1909	160	774.7		112.40	887.16	(a)
1910	217	1,204.8		192.40	1,397.20	(a)
1911	223	1,105.0		86.50	1,191.50	(a)
1912	171	869.4		80.80	950.20	(a)
1913	181	974.9		119.00	1,093.90	(a)
1914	163	716.5		229.00	946.40	(a)
1915	136	596.0		448.20	1,044.20	(a)
1916	104	115.40	240.90	388.00	744.30	(a)
1917	121	251.10	125.60	66.00	442.70	375.40
1918	80	216.41	97.41	275.70	589.53	155.43
1919	73	110.90	29.67	287.60	428.17	390.64
1920	87	145.69	30.87	8.92	185.48	361.77

(a) Not available.

TRACK EXTENSIONS AND TRACK REBUILT DURING 1920

New England District

	Extensions	Rebuilt
Connecticut:		
The Connecticut Co. (New Haven)	0.46	5.07
Maine:		
Androscoggin & Kennebec Ry. Co. (Lewiston)	0.00	1.90
Bangor Railway & Electric Co.	0.00	5.00
Cumberland County Ry. & Lt. Co. (Portland)	0.00	4.21
Fairfield & Shawmut Railway	0.00	0.25
Knox County Electric Co. (Rockland)	0.00	6.00
Somerset Traction Co. (Skowhegan)	0.00	1.00
Massachusetts:		
Boston Elevated Railway Co.	0.30	18.30
Brockton & Plymouth St. Ry. Co.	0.00	4.00
Massachusetts Northeastern St. Ry. Co.	0.00	6.00
Springfield Street Railway Co.	6.92	5.09
Union Street Railway	0.01	0.39
Worcester Consolidated St. Ry. Co.	0.41	3.90
Rhode Island:		
The Rhode Island Co. (Providence)	0.00	3.16
Vermont:		
Rutland Railway Light & Power Co.	0.50	0.12

North of Ohio and East of the Mississippi River

	Extensions	Rebuilt
District of Columbia:		
Capital Traction Co.	0.00	1.74
City & Suburban Railway Co.	0.00	0.27
Washington & Old Dominion Ry.	0.10	1.00
Washington Railway & Electric Co.	0.00	1.33
Illinois:		
Alton, Granite & St. Louis Trac. Co.	0.00	1.63
Aurora, Plainfield & Joliet R. R. Co.	0.00	1.00
Calumet & So. Chicago Railway Co.	0.00	0.04
Chicago City Railway Co.	0.00	0.06
Chicago Elevated Railways	0.00	10.44
Chicago & Interurban Trac. Co	0.00	0.80
Chicago & Joliet Electric Railway Co.	0.00	2.03
Chicago, North Shore & Milwaukee R. R. (Highwood)	0.00	1.83
Chicago Railways Company	0.92	2.06
East St. Louis Railway Co.	0.00	2.37
East St. Louis & Suburban Railway Co.	0.00	1.87
Evanston Railway Co.	0.00	2.50
Fox & Illinois Union Railway (Aurora)	0.00	0.17
Hemmond, Whiting & E. Chicago Ry. Co.	0.00	2.00
Indiana:		
Chicago, South Bend & Northern Ind. Ry. Co.	0.50	0.38
Indiana Railways & Light Co. (Kokomo)	0.19	0.00
Indiana Service Corporation (Fort Wayne)	1.00	1.42
Interstate Public Service Co. (Indianapolis)	3.33	0.00
Public Utilities Co. (Evansville)	0.00	2.50
Union Traction Co. of Indiana (Anderson)	0.62	1.34
Maryland:		
United Railways & Light Co. of Baltimore	3.50	13.50
Michigan:		
Grand Rapids Railway Co.	0.04	1.70
New Jersey:		
Trenton & Mercer County Trac. Co.	1.10	0.31
New York:		
Black River Traction Co. (Watertown)	0.00	0.25
Brooklyn City Railroad Co.	0.00	0.08
Brooklyn Rapid Transit Co. (Surface Lines)	0.00	0.97
Buffalo & Lake Erie Traction Co.	0.53	1.01
Cortland County Traction Co.	0.00	0.49
Elmira Water, Light & R. R. Co.	0.00	1.00
Empire State Railroad Corporation	0.00	0.50
Hudson Valley Ry. Co. (Glens Falls)	0.35	0.41
Interborough Rapid Transit Co.	38.84	0.00
International Railway (Buffalo)	0.25	2.60
New York Municipal Ry. Corpn. (Subway)	14.00	0.00
New York State Railways	1.02	3.77
New York, Westchester & Boston Railway Co.	1.63	0.00
Ogdensburg Street Railway Co.	0.00	0.50
Poughkeepsie & Wappingers Falls Ry. Co.	0.00	1.36
Waverley, Sayre & Athens Traction Co.	0.00	0.74
Ohio:		
Cincinnati Traction Co.	1.15	3.64
Dayton & Troy Electric Railway Co.	0.23	0.42
Ohio Traction Co.	0.07	2.88
Pennsylvania-Ohio Electric Co. (Youngstown)	0.00	3.06
Richland Public Service Co.	0.00	1.00
Springfield Railway Co.	0.00	1.00
Toledo, Bowling Green & Southern Traction Co.	0.00	20.00
Toledo, Fostoria & Findlay Railway Co.	0.00	10.00
Toledo Railways & Light Co.	2.00	0.00
Youngstown Municipal Railway	0.00	0.76
Pennsylvania:		
Altoona & Logan Valley Electric Ry. Co.	0.51	0.55
Blue Ridge Traction Co. (Danville)	6.80	0.00
Conestoga Traction Co. (Lancaster)	0.00	0.75
Eastern Pennsylvania Railways Co. (Pottsville)	0.00	1.00
Frankford, Tacony & Holmesburg St. Ry. Co. (Phila.)	0.00	3.00
Harrisburg Railways Co.	0.61	0.66
Hershey Transit Co.	0.00	15.00
Indiana County Street Ry. Co.	0.00	15.00
North Branch Transit Co.	0.15	0.55
Pittsburgh Railways Co.	0.00	25.32
Reading Transit & Light Co.	0.00	0.99
Trenton, Bristol & Philadelphia St. Ry. Co.	0.00	1.00
West Chester Street Railway Co.	0.00	1.00
West Penn Railways	0.00	2.00
Wilkes-Barre Railway Co.	0.50	0.00
York Railways Co.	0.00	2.30
Wisconsin:		
Madison Railways Co.	0.82	0.00
Milwaukee Electric Railway & Light Co.	3.48	6.75
Wisconsin Valley Electric Co.	0.92	1.00

South of the Ohio and East of the Mississippi River

	Extensions	Rebuilt
Alabama:		
Birmingham Ry., Lt. & Pwr. Co.	1.31	0.00
Florida:		
Tampa Electric Co.	0.22	0.00
Georgia:		
Georgia Railway & Power Co (Atlanta)	0.84	2.59
North Carolina:		
Durham Traction Co.	0.22	0.84
Raleigh Street Railway Co.	0.23	0.00
South Carolina:		
Charleston Consolidated Ry. & Ltg. Co.	0.24	2.00
Tennessee:		
Memphis Street Railway Co.	0.33	2.60
Nashville Railway & Light Co.	0.00	3.00
Virginia:		
Danville Traction & Power Co.	0.29	0.73
Newport News & Hampton Railway, Gas & Electric Co.	0.00	0.95
Virginia Railway & Power Co. (Richmond)	1.95	2.50
West Virginia:		
Charleston Interurban Railroad Co.	1.50	1.00
Monongahela Valley Traction Co. (Fairmont)	0.60	0.79
Ohio Valley Electric Railway Co. (Huntington)	0.00	0.71
Wheeling Traction Co.	0.00	0.32

West of the Mississippi River

	Extensions	Rebuilt
Arkansas:		
Fort Smith Light & Traction Co.	0.00	0.50
California:		
Humbolt Transit Co. (Eureka)	0.44	0.00
Los Angeles Railway Corporation	4.75	0.00
Pacific Gas & Electric Co. (Sacramento)	0.00	1.00
Petaluma & Santa Rosa R. R. Co.	0.25	0.00
Sacramento Northern Railroad	2.07	0.00
San Francisco, Napa & Calistoga Railway Co.	2.00	0.00
San Francisco-Oakland Terminal Railways	1.12	0.50
Visalia Electric Railroad Co. (Exeter)	0.00	1.50
Colorado:		
Arkansas Valley Ry., Lt. & Power Co. (Pueblo)	0.00	2.50
Denver & Intermountain Railroad Co.	0.00	0.83
Denver Tramway Co.	0.45	4.54
Iowa:		
Albia Light & Ry. Co.	0.00	0.94
Clinton, Davenport & Muscatine Railway Co.	0.50	0.00
Mississippi Valley Electric Co. (Iowa City)	0.00	0.68
Tri-City Railway Co.	0.11	0.62
Kansas:		
Arkansas Valley Interurban Ry. Co. (Wichita)	4.00	0.00
Kansas City, Leavenworth & Western Ry. Co	0.00	4.00
Minnesota:		
Duluth Street Railway Co.	1.99	3.24
Twin City Rapid Transit Co. (Minneapolis)	14.07	1.18
Wisconsin Ry., Lt. & Power Co. (Winona)	0.85	0.65
Missouri:		
City Light & Traction Co. (Sedalia)	1.50	0.00
Kansas City, Lawrence & Topeka El. R. R. Co.	0.00	3.50
Kansas City Railways Co.	3.53	3.15
St. Joseph Railway, Light, Heat & Power Co.	0.00	3.10
United Railways Company of St. Louis	0.15	22.87
Nebraska:		
Lincoln Traction Co.	0.00	0.94
Omaha & Council Bluffs St. Ry. Co.	1.00	1.50
Omaha, Lincoln & Beatrice Ry. Co. (Lincoln)	0.19	0.38
North Dakota:		
Capitol Street Car Line	0.00	0.50
Northern States Power Co. (Fargo)	0.00	0.68
Oklahoma:		
Chickasha Street Railway Co.	0.50	0.00
Enid City Railway Co.	0.00	0.53
Oregon:		
Portland Railway, Light & Power Co.	0.00	1.10
South Dakota:		
Sioux Falls Traction System	0.33	0.00
Texas:		
Dallas Railway Co.	3.60	3.60
Galveston Electric Co.	0.00	1.00
Northern Texas Traction Co.	4.94	1.42
Utah:		
Utah-Idaho Central R. R. Co.	0.00	4.50
Washington:		
Gray's Harbor Railway & Light Co.	0.00	1.04
North Coast Power Co. (Vancouver)	0.00	0.50
Puget Sound International Ry. & Power Co. (Everett)	0.27	0.00
Puget Sound Power & Light Co. (Bellingham)	0.36	0.00
Seattle Municipal Street Railway	1.87	0.00
Seattle & Rainier Valley Railway Co.	0.00	0.38
Washington Water Power Co. (Vancouver)	0.00	0.50

Canada

	Extensions	Rebuilt
British Columbia El. Ry. Co., Ltd.	2.04	0.00
Cape Breton Electric Co., Ltd.	0.34	0.24
Grand River Railway	5.69	0.00
Kitchener & Waterloo Street Railway	0.91	0.00
Levis County Railway	0.00	2.00
London & Port Stanley Railway	3.20	0.00
Montreal Tramways Co.	1.54	6.65

Canada (*Continued*)

	Extensions	Rebuilt
Moose Jaw Electric Railway Co., Ltd	1.00	4.00
New Brunswick Power Co	1.00	1.75
Nova Scotia Tramways & Power Co., Ltd	1.12	0.00
Peterboro Radial Railway	0.00	0.45
Quebec Railway, Light & Power Co	0.58	0.00
Regina Municipal Railway (Spur track)	0.26	0.00
Sarnia Street Railway Co., Ltd	0.00	1.00
Saskatoon Municipal Railway	0.57	0.00
Sherbrooke Railway & Power Co	1.14	0.00
Toronto Civic Railway	0.94	0.00
Winnipeg Electric Railway Co	0.61	2.08

SUMMARY OF TRACK CONSTRUCTION—1920

	New England District	North of the Ohio and East of the Mississippi River	South of the Ohio and East of the Mississippi River	West of the Mississippi River	Total United States	Canada	Total
TRACK EXTENSIONS							
Urban and Interurban Lines:							
Number of companies	5	30	11	25	71	16	87
Miles of track:							
Urban	8.09	75.62	5.39	37.96	127.06	18.63	145.69
Interurban	0.50	12.54	2.34	11.08	26.46	4.41	30.87
Total track extended	8.59	88.16	7.73	49.04	153.52	23.04	176.56
TRACK RECONSTRUCTION							
Urban and Interurban Lines:							
Number of companies	15	63	12	33	123	8	131
Miles of track:							
Urban	42.58	114.35	16.04	55.06	227.64	18.18	246.21
Interurban	21.81	73.23	2.00	18.52	115.56	.....	115.56
Total track rebuilt	64.39	187.58	18.04	73.58	343.59	18.18	361.77

of these companies reported no extensions or rebuilt track except the usual maintenance. There were 87 companies which reported a total of 185.48 miles extended, 78.5 per cent of which was built as city track and 16.7 per cent was built as interurban track. The remaining 4.8 per cent covers the electrified steam railroad which was extended.

The statistics in this main table are reported for individual companies which have been arranged by states, which in turn have been geographically arranged into five districts. As the greater proportion of the companies are in the district "North of the Ohio and East of the Mississippi River" it is not unusual that this district should be first in the amount of track extended or rebuilt, both urban and interurban. Again, as last year, New York State has the largest number of miles of track extended, with 54.02 miles city track and 2.60 interurban, or a total of 56.62 miles. The larger proportion of this mileage, amounting to 52.84 miles, is in New York subways. Only about 6.7 per cent of the total was extended by all the other companies in the state. Minnesota ranks next to New York, with 15.11 miles of extensions. The largest track extension by any company other than the New York subways was reported in Minnesota by the Twin City Rapid Transit Company, with a city extension of 13.28 miles. Only three other companies reported four or more miles of track extensions.

ELECTRIFIED STEAM LINES

	Extensions	Rebuilt
New York, New Haven & Hartford R. R. (yard at Cedar Hill and New Haven)	8.92	0.00

The largest amount of track rebuilt in any state was in Pennsylvania, where fourteen companies reconstructed 69.12 miles. Ohio was next, with 42.76 miles. The two states having the largest mileage rebuilt come in the same geographical section, thereby making this section, which is the same one referred to as being the first in track extensions, the banner district in track rebuilt.

The largest amount of track rebuilt by any one company during the year was by the Pittsburgh Railways Company, with 19.77 miles of city track and 5.55 miles of interurban track. Other companies reconstructing mileage above the average were United Railways & Electric Company of Baltimore, Boston Elevated Railway, United Railways of St. Louis, and the Toledo, Bowling Green & Southern Traction Company, with 13.50, 18.50, 22.87 and 20 miles respectively. There were four other companies which rebuilt more than 10 miles.

The only electrification of steam railroads that can be accounted for is 8.92 miles of new track constructed by the New York, New Haven & Hartford in and around the new classification yards at Cedar Hill, Conn., and in other yards at New Haven, Conn.

Fifteen companies from Canada, or about one-fifth of the total companies reporting extensions, constructed new track consisting of 21 miles, or about 12 per cent of the total.

An attempt has been made to determine the plans of the electric railways for the coming year, and as far as can be estimated from their replies they expect to construct in new track about 65 miles, and intend to rebuild at least 340 miles.

Professor Sheldon's Memory Honored

ON NOV. 17 impressive exercises in memory of the late Prof. Samuel Sheldon were held in New York at the Engineering Societies' Building. Addresses were made by Dr. A. E. Kennelly, professor of electrical engineering Harvard University and Massachusetts Institute of Technology; W. N. Dickinson, president New York Electrical Society; W. H. Nichols, chairman board of trustees Brooklyn Polytechnic Insititute; T. C. Martin, secretary National Electric Light Association, and Dr. C. O. Mailloux, consulting engineer.

The work done as a teacher and engineer by Dr. Sheldon during the more than thirty years of his connection with the B. P. I. was discussed by several speakers, and tributes were paid to his excellence in these fields as well as to his friendly qualities. A plan for a permanent memorial was outlined, a committee to this end with Mr. Martin as chairman having already been formed. This committee has since met and made provision for a general appeal for funds. One subscription of $1,000 was announced.

Street Railway Problem in New Orleans

IN A recent issue of the Association of Commerce *News Bulletin*, New Orleans, La., Leigh Carroll, chairman Civic Bureau New Orleans Association of Commerce, presents a statement on "The Street Railway Problem or Situation in New Orleans."

Mr. Carroll starts with the statement that "New Orleans needs a new railway system!" and then goes on to analyze the present inadequacies of service in New Orleans. He points out the limitations under which the local railways have been forced to operate for the past several years and shows the antiquated provisions of the franchises, the inadequate rate and other deficiencies of authority or opportunity for the railway really to serve the community.

He concludes by stating that the time is at hand when New Orleans must "get busy," for the whole community is suffering because adequate transportation facilities have not been allowed to develop.

Electric Railway Receiverships

Fewer Receiverships Occurred in 1920 than in Preceding Year—Only Two Large Urban Properties Are Added to the List of Bankrupts—Higher Fares and Business Prosperity Save Many from Such Serious Difficulties for the Time Being—Large Abandonments of Unprofitable Track and Service Are Indicated

A SLIGHTLY happier year for the street railways as a whole is indicated, for the year 1920 by a smaller addition to the total number of receiverships reported, as compared with the previous year. The stimulated condition of business as a whole, resulting in increased patronage for the traction companies, together with the generally increased rates of fare, saved many companies from bankruptcy during the year just passed. It should be noted further, that the drastic conditions of war times succeeded in either wiping out or causing the complete re-organization of many of the weaker companies so that as a whole the industry was in a stronger position in 1920. However, there are no cases reported of receivers being discharged without foreclosure or re-organization, all the companies reported as being in receivership on Dec. 31, 1919, either remaining under the jurisdiction of the courts or else undergoing some drastic reorganization.

TABLE I—RECORD OF ELECTRIC RAILWAY RECEIVERSHIPS

Year	Number of Companies	Miles of Single Track Involved	Outstanding Stock	Securities Bonds
1909	22	558.00	$29,962,200	$22,325,000
1910	11	696.61	12,629,400	75,490,735
1911	19	518.90	29,533,450	38,973,293
1912	26	373.58	20,410,700	11,133,800
1913	18	342.84	31,006,900	47,272,200
1914	10	362.39	35,562,550	19,050,460
1915	27	1,152.10	40,298,050	39,372,375
1916	15	359.26	14,476,600	10,849,200
1917	21	1,177.32	33,918,725	33,778,400
1918	29	2,017.61	92,130,388	163,257,102
1919	48	3,781.12	221,259,354	312,915,104
1920	16	992.11	25 313,655	68 860 575

TABLE III—ELECTRIC RAILWAY RECEIVERSHIPS—1920

(Listed alphabetically by States)

	Miles
Denver (Col.) Tramways	227.45
Pensacola (Fla.) Electric Co.	21.70
Caldwell (Id.) Traction Co.	11.40
Alton (Ill.) Granite & St. Louis Traction Co.	62.00
Kansas City (Mo.) Railways	311.50
Richmond Lt. & R.R. Co. (Staten Island, N. Y.)	32.05
Staten Island (N. Y.) Midland Ry.	28.68
Shore Line Electric R.R. (White Plains, N. Y.)	1.46
Westchester St. R.R. of White Plains, N. Y.	20.98
Western New York & Penn. Trac. Co. (Olean, N. Y.)	100.00
Ashtabula (O.) Rapid Transit Co.	5.50
Cleveland, Alliance & Mahoning Valley R.R. (Ravenna, O.).	46.00
Cleveland & Erie Ry. (Girard, Pa.)	30.00
Rhode Island Suburban Ry. (Providence)	75.39
Bryan (Tex.) & College Interurban Ry.	7.75
Barre & Montpelier (Vt.) Trac. & Power Co.	10.25
Total for 1920 (16 Cos.)	992.11

During 1920, sixteen additional companies passed into the hands of receivers, while ten were sold at foreclosure, re-organized, or wholly abandoned as an aftermath of the receivership. The mileage of the companies newly involved in receiverships is 992.11, only two large companies, the Kansas City Railways with 311.50 miles and the Denver Tramways with 227.45 miles, being included, whereas in 1919 a number of important systems were included, such as the Rhode Island Company, New York Railways, United Railways of St. Louis, and New Orleans Railway & Light Company.

The tables do not include certain companies that were sold at foreclosure for reorganization purposes only without the intervention of a receiver. So far as known there are three companies in this class, namely, the Kansas City-Western Railway; the Oakland, Antioch and Eastern Railway and the Norfolk & Bristol Street Railway.

TABLE II—RECORD OF ELECTRIC RAILWAY FORECLOSURE SALES

Year	Number of Companies	Miles of Track Involved	Outstanding Stock	Securities Bonds	Receiver's Certificates
1909	21	488.00	$22,265,700	$21,174,000	(a)
1910	22	724.36	19,106,613	26,374,075	(a)
1911	25	660.72	91,354,800	115,092,750	(a)
1912	18	267.18	14,197,300	10,685,250	(a)
1913	17	302.28	15,243,700	19,094,500	(a)
1914	11	181.26	26,239,700	44,094,241	(a)
1915	19	308.31	30,508,817	16,759,997	(a)
1916	19	430.14	13,895,400	22,702,300	(a)
1917	26	745.19	27,281,900	27,313,045	(a)
1918	23	524.22	37,740,325	20,149,384	(a)
1919	28	2,625.48	83,893,400	75,736,738	$42,300
1920	11	224.20	6 182,400	9,315 528	52 000

(a) Not available.

An interesting feature of the year just passed is the continuation of the process of dismemberment of some of the very large companies, which in the early days of the industry drew a number of the smaller independent lines together into unified operating systems either by stock control or long-term leases. It has been the customary and generally accepted belief that such mergers would result in increased net earnings by means of greater operating efficiency and the elimination of duplicated management expenses and competing service.

TABLE IV—ABANDONMENTS—ENTIRE—1920

(Includes only companies whose entire traction property has been dismantled or permanently abandoned and not likely to resume operations)

	Miles	Stock	Bonds
Colorado Springs. (Col.), Cripple Creek District Ry. (Electric Div.)	18.50	(b) 2,000,000	(b) 2,827,878
Durango (Colo.) Ry. & Realty Co.	2.50	(a)	(a)
Blue Hill St. Ry. (Canton, Mass.)	19.50	300,000	250,000
Norwood, Canton & Sharon (Mass.) St. Ry.	6.20	(a)	(a)
Plymouth (Mass.) & Sandwich St. Ry.	6.40	151,800	None
Norfolk & Bristol St. Ry. (Foxboro)	21.74	200 000	189 000
Columbus (Miss.) Ry. Lt. & Power Co.	(d) 6.80	(d)	(d)
Southern Ry. & Lt. Co. (Natchez, Miss.)	(d) 6.00	(d)	(d)
N. Y. & North Shore Trac. Co. (Roslyn)	38.12	979,350	800,000
Penn. Central Ry. Co. (Johnstown)	7 50	250,000	......
Cincinnati (O.) & Columbus Trac. Co.	53.00	(a)	(a)
Cumberland Ry. Co. (Carlisle, Pa.)	11.00	350,000	404,700
Providence (R. I.) & Danielson Ry. (c)	38.00	1,000,000	600,000
Sea View R.R. (Wakefield, R. I.)	20.90	700,000	600,000
Greenville (Tex.) Ry. & Lt. Co.	8.00	300 000	300,000
Longview (Tex.) & Junction St. Ry.	1.00	(a)	(a)
Mineral Hts. St. Ry. (Greenville, Tex.)	2.75	(a)	(a)
Total for 1920 (16 companies)	267.91	6.231,150	5,971 578

(a) Not available.
(b) Covers capitalization of entire property.
(c) Line between North Scituate, R. I., and East Killingly already dismantled, balance will be torn up unless saved by local communities.
(d) Railway department only is abandoned. Company still continues light and power business.

The failure of the merger, when failure has resulted, may be ascribed to various causes, but it is certain that part of the trouble has been due to including in such mergers, many weak lines operating through territory where the traffic was never sufficient to justify operation as a paying proposition. This dismemberment feature is noted in such companies as the New York Railways, which in 1919 returned to the original owners the Eighth and Ninth Avenue lines, and in 1920, the Fourth Avenue line (New York & Harlem Railroad). The Rhode Island Company has turned back several leased properties, and the Shore Line Electric Railway of Connecticut has done the same. In the last named case, the receiver is now operating only 74 miles out of an original system of 246 miles, the balance having been returned to the original owners or abandoned. In some instances, the lines so severed from the bankrupt company are being operated successfully as individual units. In other cases after spasmodic attempts at operation, they have gone to the scrap dealer.

The tabulation of receiverships does not portray the entire situation in its full seriousness, as there are a number of companies whose bond interest is in default, and which are only permitted to continue without the intervention of a receivership due to the leniency of the bondholders or other creditors who have faith in a better future.

The statistics are presented in the usual way. Tables I and II give a summary of receiverships and foreclosures, respectively, by years from 1909 to date. The table of foreclosures includes all those companies which have been entirely reorganized or sold to the junk dealer, whether through actual process of foreclosure by the court or otherwise. The figures for 1919 do not in all cases agree with those published a year ago in the ELECTRIC RAILWAY JOURNAL of Jan. 3, 1920, due to additional and corrected information which has been received during this past year.

Table III is a separate list of the 1920 receiverships given to bring out these items more clearly than is done in the general tabulation. They will be found included in greater detail in Table IV, which shows the existing conditions, including all properties in receiver's hands at any time during 1920 as far as could be determined. Every effort has been made to get these statistics confirmed by

TABLE V—ELECTRIC RAILWAY RECEIVERSHIPS AND FORECLOSURES AS OF DEC. 31, 1920

			Outstanding Securities		
	Year of Receivership	Miles of Single Track Involved	Capital Stock	Funded Debt	Receivers' Certificates
New England District					
Connecticut					
Danbury (Ct.) & Bethel St. Ry.	1917	16.00	$320,000	$588,500	$60,000
Hartford & Springfield St. Ry. (Warehouse Point)	1918	48.00	785,000	961,000	None
Shore Line Electric Ry. (c)	1919	74.17	1,000,000	6,700,000	None
Maine					
Atlantic Shore Ry. (Kennebunk)	1915	49.93	1,000,000	1,746,250	None
Massachusetts					
Plymouth (Mass.) & Sandwich St. Ry. (a)	1918	6.40	151,800	None	None
Blue Hill St. Ry. (Canton) (a)	1919	19.70	300,000	250,000	2,000
Brockton & Plymouth (Mass.) St. Ry.	1919	22.00	250,000	260,000	None
New Hampshire					
Portsmouth, Dover (N. H.) & York St. Ry.	1917	42.33	(i)	707,000	20,000
Rhode Island					
Bay State St. Ry. (Newport Div.) (b)	1917	22.20	(b)	996,800	None
Rhode Island Co. (Providence) ( )	1919	101.15	9,685,500	1,662,000	None
United Traction & Electric Co.	1919	289.93	8,000,000	9,000,000	None
Rhode Island Suburban Ry. (Providence, R. I.)	1920	75.39	5 000 000	4 708 000	None
Vermont					
Springfield (Vt.) Elec. Ry.	1918	9.00	100,800	100,000	22,323
Barre & Montpelier (Vt.) Traction & Pwr. Co.	1920	10.25	(k) 2,337,000	(k) 1,986,300	None
Summary					
Total 1/1/20	11 cos.	842.54	$21,343,100	$22,711,500	$107,323
Net changes and corrections	1 cos.	*141.63*	250,000	260,000	*3,000*
Receiverships added during 1920	2 cos.	85.64	7,337,000	6,694,300	....
Less those sold or reorganized during 1920	*2 cos.*	*25.90*	*451,800*	*250,000*	*2,000*
Net receiverships 12/31/20	12 cos.	760.65	28,478,300	29,415,800	102,323
North of the Ohio and East of the Mississippi River					
Illinois					
Chicago (Ill.) & Oak Park Elevated R.R.	1911	20.97	10,000,000	6,537,000	1,645,000
Chicago, Aurora (Ill.) & De Kalb R.R.	1916	30.20	950,000	427,500	None
Galesburg & Western R.R. (Rock Island) (a)	1919	16.00	500,000	521,000	None
Aurora, Elgin & Chicago (Wheaton) R.R.	1919	168.00	6,200,000	8,371,000	None
Alton (Ill.) Granite & St. Louis Traction Co.	1920	62.00	3,189,000	3,000,000	None
Indiana					
Winona Interurban Ry. Co. (Warsaw)	1916	70.00	750,000	2,343 700	None
Beech Grove (Ind.) Traction Co.	1917	3.90	150,000	100,000	None
Vincennes (Ind.) Traction Co.	1919	7.50	350,000	235,000	50,000
Michigan					
Marquette City & Presque Isle (Mich.) Ry. (d)	1912	6.00	200,000	100,000	None
New Jersey					
North Jersey Rapid Transit Co. (Hohokus)	1912	18.00	800,000	800,000	None
Atlantic City (N. J.) & Shore R.R. Co.	1915	49.89	1,000,000	950,000	None
Monmouth County Elec. Co. (Red Bank) (d)	1916	18.50	350,000	500,000	17,500
New York					
Second Ave. R.R. (New York City)	1908	30.02	1,862,000	5,631,000	3,140,000
Rochester (N. Y.) Corning & Elmira Trac. Co. (j)	1912	(j) 6.00	271,000	1,000,000	None
Buffalo (N. Y.) & Lake Erie Traction Co. (h)	1915	168.00	7,500,000	7,066,000	960,000
Hornell (N. Y.) Traction Co. (d)	1917	10.90	117,900	150,000	25,000
Manhattan & Queens Trac. Co. (Long Isl. City)	1917	21.20	(x) 20 000	(x) 2 196 000	None
Binghamton (N. Y.) Ry. Co.	1918	49.74	978,995	2,390,000	40,000
Buffalo (N. Y.) & Depew Ry.	1918	13.59	305,000	350,000	60,000
Penn Yan (N. Y.) & Lake Shore Ry.	1918	8.50	94,000	100,000	6 000
Brooklyn (N. Y.) Rapid Transit Co.	1918	(Holding Co.)	(l) 87,788,268	(l) 126,107,477	18,000,000
New York Consolidated Ry.	1918	141.68	18,900,000	22,967,000	5,000,000
New York Municipal Ry. Corp.	1918	67.82	2,000,000	60,000,000	13,000,000
Surface Lines:					
Brooklyn Heights R.R.	1919	36.60	2,000,000	(n) 8,242,174	None
Brooklyn, Queen's County & Suburban R.R.	1919	61.92	2,000,000	(n) 9,256,710	None
Nassau Electric Ry.	1919	144.39	15,000,000	(n) 20,787,115	None
Coney Island & Brooklyn Ry.	1919	59.53	2,983,900	(n) 6,223,298	None
Interboro Consolidated Corp.	1919	(Holding Co.)	50,403,634	67,825,000	None
New York (N. Y.) Railways Co.	1919	(p) 97.72	(p) 22 081 760	(p) 53,122,483	None
Richmond Lt. & R.R. Co. (Staten Island)	1920	32.05	(f) 1,932,000	(f) 1,482,000	None
Staten Island (N. Y.) Midland Ry. Co.	1920	28.68	1,000,000	1,000,000	None
Western New York & Penn. Trac. Co. (Olean)	1920	100.00	1 599 355	2,492,000	None
Westchester St. R.R. of White Plains	1920	20.98	700,000	168,000	34 800
Shore Line Elec. R.R. (White Plains)	1920	1.46	50,000	None	None
Ohio					
Sandusky, Norwalk (O.) & Mansfield Elec. Ry.	1912	33.00	600,000	600,000	None
Cincinnati (O.), Lawrenceburg & Aurora Elec. St. Ry.	1913	31.89	808,900	750,000	None
Interurban Ry. & Terminal Co. (Cincinnati)	1914	41.03	3,500,000	1,650,000	49,000
Plymouth & Shelby Trac. Co. (d)	1917	6.97	200,000	200,000	None
Ohio River Elec. Ry. (Pomeroy)	1919	12.70	300,000	315,000	None
Springfield (O.) Term. Ry. & Power Co. (a)	1919	33.00	350,000	250,000	None
Cleveland, Alliance & Mahoning Valley R.R.	1920	46.00	1,100,000	1,100,000	None
Ashtabula (O.) Rapid Transit Co.	1920	5.50	500,000	382,000	....
Pennsylvania					
Philadelphia & Easton Elec. Ry. (Doylestown)	1912	31.00	612,600	911,000	None
Sunbury (Pa.) & Susquehanna Ry. (d)	1913	9.20	600,000	640,000	None
North Branch Transit Co (Bloomsburg) (d)	1915	30.00	500,000	532,500	None
Buffalo & Lackawanna Trac. Co. (Erie)	1918	8.80	55,000	1,000,000	None
Cumberland Ry. Co. (Carlisle) (a)	1918	11.00	350,000	404,700	None
Pittsburgh (Pa.) Railways	1918	605.25	21,726,750	41,579,500	None
Scranton (Pa.) & Binghamton Ry. (d)	1918	50.00	6,000,000	4,100,000	....
Philadelphia (Pa.) Rys. Co.	1919	16.00	400,000	400,000	None
Penn. Central Ry. Co. (Johnstown) (i)	1919	7.50	250,000	....	....
Northampton Traction Co. (Easton)	1919	21.00	500,000	1,009,000	5,000
Northampton, Easton (Pa.) & Wash. Trac. Co.	1919	17.80	1,250,000	739,000	None
Cleveland & Erie Ry. (Girard)	1920	30.00	300,000	1,000,000	None
Summary					
Total 1/1/20	44 cos.	2,379.17	$138,317,549	$288,415,735	$24,245,500
Net changes and corrections	...	*81.82*	*2,850,544*	*516,000*	*297,000*
Receiverships added during 1920	9 cos.	326.67	10,370,355	10,624,000	34,800
Less those sold or reorganized during 1920	*4 cos.*	*6.750*	*1,450,000*	*1,175,700*	....
Net receiverships 12/31/20	49 cos.	2 556.52	144,387,360	297,348,035	23,983,300

correspondence with the companies in question, but where replies could not be obtained the data have been taken from financial papers and other sources believed to be reliable.

In some cases, additional or corrected information has been received concerning the figures published a year ago in the ELECTRIC RAILWAY JOURNAL. To bring the statistics up to date, a line showing net changes has been added to the summaries for each group as well as in the recapitulation summary in Table V.

Two companies not heretofore included have been added, namely, the Charlotte (N. C.) Rapid Transit Co. with 2 miles of track and $75,000 capital stock, and the Brockton & Plymouth (Mass.) Street Railway Co. with 22 miles of track, $250,000 capital stock and $260,000 bonds. This record shows that after adding the new receiverships occurring during the year, and deducting the companies foreclosed, reorganized or wholly abandoned, there remain in receivership at the close of the year 91 companies with 5,330.25 miles of track, representing about 11 per cent of the total street railway mileage of the United States. So far as has been learned, there are no Canadian companies in receivership.

TABLE V—ELECTRIC RAILWAY RECEIVERSHIPS AND FORECLOSURES AS OF DEC. 31, 1920

Continued

	Year of Receivership	Miles of Single Track Involved	Outstanding Securities		
			Capital Stock	Funded Debt	Receivers' Certificates
South of the Ohio and East of the Mississippi River					
Alabama					
Birmingham (Ala.) Tidewater Ry.	1919	32.80	$325,000	$1,500,000	$12,000
Birmingham (Ala.) Ry. Lt. & Power Co.	1919	154.96	(*r*) 4,230,000	(*r*) 8,820,000	363,000
Montgomery (Ala.) Lt. & Traction Co.	1919	38.00	(*k*) 2,000,000	(*k*) 1,430,000	(*k*) 250,000
North Alabama Traction Co. (Albany) (*d*)	1919	7.63	75,000	225,000	....
Florida					
Jacksonville (Fla.) Traction Co.	1919	64.10	1,500,000	(*y*) 2,034,500	65,000
Pensacola (Fla.) Electric Co.	1920	21.70	(*k*) 1,100,000	(*ky*) 1,789,900	(*k*) 25 000
Georgia					
City & Suburban Ry. Co. (Brunswick)	1919	9.50	100,000	194,000	None
Savannah (Ga.) Elec. Co.	1919	57.72	(*k*) 3,500,000	(*ky*) 6,074,376	None
Mississippi					
Jackson (Miss.) Lt. & Trac. Co.	1919	13.50	(*k*) 1,600,000	(*k*) 915,000	None
North Carolina					
Charlotte (N. C.) Rapid Transit Co. (*a*)	1918	2.00	75,000	None	None
Tennessee					
Memphis (Tenn.) St. Ry.	1919	130.40	5,000,000	8,164,000	None
Chattanooga (Tenn.) Ry. & Lt. Co. (*m*)	1919	68.43	(*k*) 5,000,000	(*l*) 2,790,000	None
West Virginia					
Morgantown (W. Va.) & Wheeling Trac. Co. (*s*)	1916	(*s*) 27.00	345,000	500,000	214,000
Grafton (W. Va.) Lt. & Power Co.	1917	7.00	(*t*) 400,000	(*t*) 300,000	None
West Va. Traction & Elec. Co. (Wheeling) (*o*)	1919	39.00	1,869,600	4,762,000	None
So. Morgantown (W. Va.) Trac. Co. (*o*)	1919	6.00	36,000	None	None
Summary					
Total 1/1/20	14 cos.	567.48	$25,980,600	$40,500,004	$270,000
Net changes and corrections	1 cos.	*9.44*	75,000	*2,790,424*	420,000
Receiverships added during 1920	1 cos.	21.70	1,100,000	1,789,900	25,000
Less those sold or reorganized during 1920	*3 cos.*	*47.00*	*1,980,600*	*4,762,000*	....
Net receiverships 12/31/20	13 cos.	532.74	25,175,000	34,737,280	715,000
West of the Mississippi River					
Arizona					
Tucson (Ariz.) Rapid Transit Co.	1919	4.35	500,000	114,800	None
Colorado					
Denver (Col.) & Interurban R.R. (*d*)	1918	44.43	101,500	1,079,000	None
Colorado Springs (Col.) & Cripple Creek R.R. (*o*)	1919	78.80	(*k*) 2 000 000	(*k*) 2 827 878	(*k*) 50 000
Denver (Col.) Tramways	1920	227.45	6,156.300	19,388,025	None
Idaho					
Caldwell (Id.) Traction Co.	1920	11.40	250,000	None	None
Iowa					
Des Moines (Ia.) City Ry. Co.	1918	94.00	1,305,000	5,981,000	10,000
Kansas					
Southwestern Interurban Ry. (Winfield)	1919	25.00	150,000	None	None
Louisiana					
New Orleans (La.) Ry. & Lt. Co.	1919	222.12	(*k*) 30,199,050	(*k*) 38,481,000	(*k*) 750,000
Minnesota					
St. Paul Southern Ry. Co. (Hastings) (*d*)	1918	17.54	658,225	425,400	40,000
Missouri					
Kansas City (Mo.) Outer Belt Elec. R.R. (*d*)	1912	( )	None	1,298,000	100,000
Kansas City, Ozark & Southern Ry. (Ava) (*d*)	1913	15.00	300,000	None	....
Kansas City (Mo.), Lawrence & Topeka R.R.	1919	12.00	250,000	400,000	None
United Railways Co. of St. Louis (Mo.)	1919	460.90	41,296,000	52,603.000	3,177,000
Missouri Electric R.R. (St. Louis)	1919	19.06	1,000,000	700,000	None
Kansas City (Mo.) Railways	1920	311.50	(*w*) 100,000	30,364,350	None
Oregon					
Southern Oregon Traction Co. (Medford) (*d*)	1918	8.19	150,000	150,000	....
Texas					
Corpus Christi (Tex.) Ry. & Lt. Co.	1919	9.75	....	(*q*) 1,694 507	14 539
Greenville (Tex.) Ry. & Lt Co. (*o*)	1919	8.00	300,000	300,000	None
Bryan (Tex.) & College Interurban Ry.	1920	7 75	(*u*)	(*u*)	(*u*)
Summary					
Total 1/1/20	15 cos.	1,002.26	$78,210,975	$104,470,078	$3,063,611
Net changes and corrections	......	3 78	*1,000*	1,484,507	1,077,928
Receiverships added during 1920	4 cos.	558.10	6,506,300	49,752,375	....
Less those sold or reorganized during 1920	*2 cos.*	*83.80*	*2,300,000*	*3,127,878*	*50,000*
Net receiverships 12/31/20	17 cos.	1,480.34	82,416,275	152,579,082	4,091,539
RECAPITULATION					
Total 1/1/20	84 cos.	4,791.45	$263,852,224	$456,097,317	$27,686,434
Net changes and corrections	2 cos.	*229.11*	*2,526,544*	*1,762,117*	1,197,928
Receiverships added during 1920	16 cos.	992.11	25,313,655	68,860,575	59,800
Less those sold or reorganized during 1920	11 cos.	*224.20*	*6,182,400*	*9,115,578*	*58,000*
Net receiverships 12/31/20	91 cos.	5,330.25	280,456,935	514,080,197	28,892,162

NOTES

(*a*) Sold at foreclosure during 1920.

(*b*) Still in receivership but leased to Newport County Electric Co. Figure given in funded debt column includes proportion of capital stock applicable to electric railway.

(*c*) Property is being disembered and reorganized without foreclosure sale, but under receiver.

(*d*) Included in last years' report. No information available as to present status.

(*e*) Reported as sold by foreclosure during 1920, without formal receivership proceedings.

(*f*) Figures represent railway securities only. Estimated to be 67.4 per cent of total.

(*g*) Property is being dismembered and sold, but not under formal foreclosure proceedings.

(*h*) Figures include Hamburg Railway Company $750,000 First Mortgage Bonds, due Nov. 1926 on 17.70 miles track for which separate receiver was appointed Aug. 31, 1920.

(*i*) Included in that of the Atlantic Shore Railway.

(*j*) This Company secured right of way but built no track.

(*k*) Securities include total property. Railway cannot be separated.

(*l*) Figures given are for total amount of B. R. T. securities in the hands of the public, including also those of lessor companies whose securities are guaranteed by the B.R.T.

(*m*) Receivership limited to Chattanooga Railway lines only.

(*n*) Includes certificates of indebtedness held by B.R.T.

(*o*) Figures given cover steam and electric divisions, of which 18.50 miles is electric. It is reported operation ceased May 17, 1920, and line is partly dismantled.

(*p*) Excludes track and securities of three leased and controlled companies which have been returned to their owners for independent operation; viz.: Eighth Avenue R.R.; Ninth Ave. R.R., and the New York and Harlem R.R. (Fourth Avenue lines.)

(*q*) Total of securities outstanding for combined property.

(*r*) Railway securities shown, estimated at 57.2 per cent of total.

(*s*) But three miles of road is electrified, the balance being operated by steam. Figures shown are for the entire property.

(*t*) Figures given are for railway property only.

(*u*) No information available.

(*v*) Has no track built.

(*w*) Stock has no par value. Nominal value given.

(*x*) No bonds issued. Cost of construction carried by temporary note issues. $20,000 in stock subscription rights.

(*y*) Includes notes and bank loans.

The list of entire companies abandoned and junked is about the same in number and character as last year, but the number of companies reporting partial abandonments and suspensions is much greater. It is evident that there has been a determined effort to eliminate unprofitable track and service, in order to preserve investments threatened by shrinkage of net earnings.

TABLE VI—ABANDONMENTS—PARTIAL—1920

(Includes all pieces of track, sidings, yards, etc., permanently abandoned—Companies arranged alphabetically by States)

	Miles
Humboldt Transit Co. (Eureka, Cal.)	0.95
Los Angeles (Cal.) Ry.	5.40
Peninsula Ry. Co. (San Jose, Cal.), (spur track)	0.17
Point Loma Ry. (San Diego, Cal.)	1.80
Sacramento-Northern Rys., Cal. (spurs and sidings)	1.02
San Francisco-Oakland Terminal Rys. (Cal.)	0.19
San Jose (Cal.) R.R.	1.56
Denver & Intermountain R.R. (Col.)	0.08
Denver (Col.) Tramways	0.41
Connecticut Co. (New Haven, Conn.) (sidings)	0.83
Shore Line Electric R.R. (Norwich, Conn.), (between New Haven and New London)	64.66
Tampa (Fla.) Electric Co.	0.16
Georgia Ry. & Power Co. (Atlanta, Ga.)	0.17
Savannah (Ga.) Electric Co.	1.60
Alton (Ill.) Granite & St. Louis Trac. Co.	0.93
Chicago (Ill.) Railways	1.03
East St. Louis (Ill.) & Suburban Ry.	0.16
Indiana Service Corp. (Ft. Wayne)	0.17
Interurban Ry. (Des Moines, Ia.)	4.72
Arkansas Valley Interurban Ry. (Wichita, Kan.)	2.00
Manhattan City (Kan.) & Interurban Ry.	1.60
Salina (Kan.) St. Ry.	0.50
Southeastern Interurban Ry. (Winfield, Kan.)	3.00
United Railways & Electric Co. (Baltimore, Md.)	0.90
Berkshire St. Ry. (Pittsfield, Mass.)	13.00
Massachusetts Northeastern St. Ry. (Haverhill)	3.30
Medway & Dedham St. Ry. (Westwood, Mass.)	4.00
Grand Rapids (Mich.) Ry. Co.	0.13
Wisconsin Ry., Lt. & Power Co. (Winona, Minn.)	0.44
City Light & Traction Co. (Sedalia, Mo.)	8.25
Kansas City (Mo.) Railways	0.63
New York State Rys.	0.39
Ogdensburg (N. Y.) St. Ry.	0.50
Orange County Traction Co. (Newburgh, N. Y.)	0.28
Waverly (N. Y.) Sayre & Athens Trac. Co.	3.02
Reno (Nev.) Traction Co.	4.00
Toledo (O.) Rys. & Lt. Co.	0.64
Toledo, Bowling Green & Southern Trac. Co. (Findlay, O.)	3.00
Bartlesville (Okla.) Interurban Ry.	5.00
Chickasha (Okla.) St. Ry.	1.00
Guthrie (Okla.) Ry. Co.	0.50
Portland (Ore.) Railway, Light & Power Co.	1.34
Northwestern Pennsylvania Ry. (Meadville, Pa.)	1.40
Pittsburgh (Pa.) Railways	1.03
Shamokin & Mt. Carmel (Pa.) Transit Co.	0.75
El Paso (Tex.) Ry. Co.	0.15
Virginia Ry. & Power Co. (Norfolk Div.)	6.00
Seattle (Wash.) Municipal Ry.	0.29
Tacoma (Wash.) Ry. & Pwr. Co.	0.08
Monongahela Valley Trac. Co. (Fairmont, W. Va.)	0.20
Milwaukee (Wis.) Elec. Ry. & Lt. Co.	0.65
New Brunswick Power Co. (St. John, N. B.)	0.25
Grand River Ry. (Galt, Ont.)	2.00
Montreal Tramways (Que.)	0.96
Winnipeg Electric Ry. (B. C.)	1.24
British Columbia Electric Ry. Co. (Vancouver)	2.24
Total for 1920 (56 Cos.)	160.68

TABLE VII—SUSPENSIONS OF SERVICE 1920

(Includes miles of track on which companies have ceased to operate, but which have not been permanently abandoned or ripped up.)

	Miles
Douglas (Ariz.) Traction & Lt. Co.	10.00
San Diego (Cal.) Electric Ry.	4.96
Miami (Fla.) Traction Co.	5.00
Indiana Service Corp. (Ft. Wayne, Ind.)	8.64
Androscoggin & Kennebec Ry. (Lewiston, Me.)	8.00
United Railways & Electric Co. (Baltimore, Md.)	4.30
Berkshire St. Ry. (Pittsfield, Mass.)	19.53
Boston (Mass.) Elevated Ry.	8.00
Eastern Massachhsetts St. Ry. System:	
Line between Wakefield & Lynn	2.32
Line between East & South Weymouth	3.49
Line between Wilson's Corner and Andover Sq.	1.39
Line between Mann's Corner and Assinippi	1.07
Line between Hyde Park and Dedham	3.15
Line between Linden and Cliftondale	1.58
Line between Saugus and Cliftondale	0.86
Gloucester Div (all lines)	22.49
Wollaston loop (Quincy Div.)	2.27
Lincoln Ave., Haverhill	0.91
Milford (Mass.) Attleboro & Woonsocket St. Ry.	3.80
Kansas City (Mo.) Railways	2.51
Jersey Central Traction Co. (Keyport, N. J.)	2.00
Point Pleasant (N. J.) Traction Co. (Entire line)	3.72
Trenton, Lakewood (N. J.) & Seacoast R. R.	3.00
Brooklyn (N. Y.) Rapid Transit Co.	30.00
Ocean Ave. and Rogers Ave. lines from Flatbush Ave. and Rogers St. to Eastern District Ferry.	
Church Ave. line from Church and Reckaway Aves. to 39th St. Ferry.	
Park Avenue line from Broadway to Sands St. (entire line).	
Metropolitan Ave. line from Dry Harbor Ave. to Jamaica, also from Flushing Ave. to East River.	
Wyckoff Ave. line from Myrtle Avo. to Flushing (entire line).	
Ralph Ave. Shuttle from Ralph Ave. and St. Johns Place to Church Ave.	
Westchester St. R. R. (White Plains, N. Y.)	1.12
Goldsboro (N. C.) Electric Ry. (Entire line)	5.00
Pennsylvania & Ohio Trac. Co. (Ashtabula, O.)	2.00
Springfield (O.) Terminal Ry. & Power Co. (Entire line)	28.00
Toledo (O.) Rys. & Lt. Co.	0.75
Longview (Tex.) & Junction Ry. (entire line)	1.00
Walla Walla (Wash.) Valley Ry.	3.60
Total for 1920 (22 Cos.)	194.46

The largest individual abandonment reported is that of the Shore Line Electric Railway of Connecticut, which has abandoned 64 miles of track between New Haven and New London. Eight miles of this has already been torn up. It is now reported that some efforts are being made by certain communities along these abandoned routes to arrange for restoring service.

The trustees operating the Eastern Massachusetts Street Railway, formerly the Bay State system, have continued their policy of suspension of service on lines where the traffic would not support operation at any reasonable rate of fare. The largest portion of this system which ceased operation was the entire Gloucester Division, involving 22 miles of track. In some communities in Eastern Massachusetts operation has only been continued by means of local subsidies. The trustees have also practically eliminated jitney competition by the straightforward expedient of giving the local authorities the option of properly regulating the jitneys or giving up the street car service, and in several instances have given the citizens a trial of jitney service without street cars. This single experiment has generally demonstrated without question the inability of the jitneys adequately to provide for the transportation requirements of the community.

Altogether, the financial situation of the electric railways during 1920 may be said to have been a little better than during the two years immediately preceding, but it is still far from being even moderately satisfactory, and many companies are still running so close to the danger of bankruptcy that it is a question whether they can survive the business depression which the country as a whole is now experiencing.

Securing Co-operation of Trainmen in Accident Reduction

W. R. ALBERGER, vice-president and general manager San Francisco-Oakland Terminal Railways, recently addressed a letter to the motormen and conductors on his property giving them a report of the accident situation for the first nine months of 1920 as compared with the same period of 1919. By means of tables and comments he showed that the accidents over which the motormen and conductors had control had decreased in number this year by thirty-seven, and he expressed the thanks of the management for this showing. He said that whereas in 1919 there was an accident for every 30,319 passengers, in 1920 there was one for every 31,212 passengers. For ten months, including October, 1920, $110,039 had been expended for injuries to persons and damage to property, settlements by the claim agent or in lawsuits, as compared with $40,942 for the preceding year. These costs were 3.5 per cent of the operating expenses in 1920 as compared with less than 1.8 per cent in 1919.

Trackless Trolley in Richmond

FURTHER details are available in regard to the proposed trackless trolley system in Richmond, Va., mentioned on page 1167 of the issue of this paper for Dec. 4. A trial bus, seating thirty persons, will be tested out by the Virginia Railway & Power Company on Floyd Avenue. If successful other lines will be built.

Electric Railway Statistics

Figures Are Given by States and Districts of the Number of Electric Railway Companies Operating, with the Miles of Single Track and the Amount and the Type of All the Rolling Stock Owned by Them

STATISTICS of the miles of track and types of rolling stock of the electric railway companies in the United States have been compiled from the August, 1920, "Electric Railway Directory" of the McGraw-Hill Company and are given in the accompanying table. This information was gathered for the directory in June and July of this year and may be said to represent the statistics of the electric railways about July 1, 1920. This date corresponds to that of a similar table for last year, published on page 56 of this paper for Jan. 3, 1920.

In the compiling of this table every effort has been made to prevent duplication. This was difficult in some cases, where both the holding and operating company had submitted figures covering the same mileage and equipment. The mileage is single track equivalent for all the city and interurban companies, but for the electrified steam railroads their route mileage (aggregating 1,734 miles) was taken. The difference here represents a difference in practice in reporting mileage followed by the steam and electric railways. With the rolling stock, the passenger and freight cars are subdivided into motor and trailer. Service cars are nonrevenue cars, such as work cars, snow plows, etc. "Other cars" consist of funeral, sleeping, dining and other miscellaneous cars which cannot be accurately classified.

If the totals of 1920 are compared with those of 1919 a decrease of ten in the total number of companies will be noticed. This decrease represents the companies which have ceased operation. The miles of track show a decrease of 236 from 47,941 miles in 1919 to 47,705 miles in 1920, while the total rolling stock shows an increase of 643 cars from 104,945 in 1919 to 105,588 cars in 1920. The differences in the reports of individual companies to account for these changes can be traced, but owing to probable variations in the methods followed by the companies in reporting, the numerical differences mentioned above are not very significant. Many companies use the terms "express cars," "freight cars" and "service cars" as interchangeable terms.

A short explanation should be made as to the inclusion and exclusion from the table of the freight cars of certain roads. As the primary purpose of the table as regards cars is to give the number in regular electric passenger and freight service, in cases where a company engaged extensively in interchange and had a large number of freight cars in comparison to its passenger cars, the freight cars have, as a rule, been omitted. This step was taken in the case of 1,422 trailer freight cars of the Northwestern Pacific Railroad Company, 2,405 trailer freight cars of the Fort Dodge, Des Moines & Southern Railroad, and 2,809 trailer freight cars of the Long Island Railroad. The 3,000 "other" cars reported by the Chicago Tunnel Company were also omitted. The table includes the 1,171 freight trailers of the Pacific Electric Railway, 510 coal cars of the St. Louis & Bellevue Electric Railway for transporting coal over a line about 17.63 miles long, and 910 freight cars of the Illinois Traction Company.

STATISTICS OF ELECTRIC RAILWAY COMPANIES IN THE UNITED STATES

State	No. of Companies Operating	Miles of Single Track	Passenger Cars		Electric Locomotives	Freight and Express Cars		Service Cars	Other Cars
			Motor	Trailer		Motor	Trailer		
New England States									
Connecticut....	8	1,425.83	1,869	98	108	95	22	24	258
Maine........	13	519.71	538	10	5	29	80	99	95
Massachusetts.	34	2,887.28	6,411	271	14	216	11	911	125
New Hampshire	11	250.95	290	...	1	1	1	20	14
Rhode Island..	4	422.97	1,082	59	4	34	69	174	5
Vermont......	8	103.13	127	...	4	10	9	11	3
Total.......	78	5,609.87	9,317	438	136	385	192	1,239	500
Eastern States:									
Delaware......	2	158.80	225	98	...	4	1	28	4
D. of Columbia	8	413.30	1,124	263	7	22	41	57	38
Maryland....:.	12	707.70	2,050	59	14	3	48	24	89
New Jersey....	23	1,591.78	3,171	2	2	20	5	318	46
New York.....	84	5,772.34	17,762	1,893	158	160	43	1,083	1,176
Pennsylvania..	101	4,306.69	7,419	129	4	109	115	619	1,575
Virginia.......	12	440.43	775	60	3	16	29	59	6
W. Virginia....	18	670.76	632	23	13	29	4	42	59
Total.......	260	14,061.80	33,158	2,527	201	363	286	2,230	2,993
Central States:									
Illinois........	55	3,737.83	5,815	740	53	15	1,967	138	316
Indiana.......	30	2,420 03	1,867	64	9	61	439	100	336
Iowa..........	23	946.49	941	60	36	18	400	53	182
Kentucky.....	7	455.60	1,013	22	...	12	27	43	21
Michigan......	24	1,787.00	2,792	70	20	47	332	119	321
Minnesota.....	12	735.33	1,377	14	1	2	...	16	105
Missouri......	22	1,166.80	2,667	174	3	12	15	110	69
Ohio..........	59	4,190,82	5,165	542	28	132	332	520	458
Wisconsin.....	16	767.98	902	112	2	...	...	21	407
Total.......	248	16,207.88	22,539	1,798	152	299	3,512	1,120	2,215
Southern States:									
Alabama......	12	361.98	427	89	1	5	2	27	141
Arkansas......	10	128.80	240	10	...	4	...	2	26
Florida:.......	10	218.75	305	11	...	7	21	14	11
Georgia.......	12	487.71	677	43	1	3	22	47	29
Louisiana......	9	322.66	654	51	...	8	1	106	9
Mississippi....	7	97.87	116	2	2	...	...	...	23
North Carolina	11	302.62	323	13	18	6	177	11	11
South Carolina	4	147.27	187	27	...	...	...	5	18
Tennessee.....	11	453.99	741	100	1	1	2	46	41
Total.......	86	2,521.65	3,670	346	23	34	225	258	309
Western States:									
Arizona.......	4	54.20	52	1	...	...	...	2	...
California.....	35	3,322.03	3,661	317	68	33	1,648	502	140
Colorado......	14	483.94	444	145	8	6	171	43	40
Idaho.........	3	102.20	37	...	...	6	26	...	2
Kansas........	14	515.05	369	45	2	17	88	26	27
Montana......	7	856.56	119	26	89	...	5	15	...
Nebraska......	4	301.96	583	20	1	...	...	6	50
Nevada.......	2	10.80	9	...	...	...	...	...	...
New Mexico...	2	10.95	16	...	...	...	...	...	...
North Dakota	4	27.08	37	24	...	2	...	5	...
Oklahoma.....	16	331.32	292	11	3	2	42	19	64
Oregon........	8	696.18	731	93	24	8	477	129	35
South Dakota .	3	25.85	33	4	...	...	...	1	3
Texas.........	22	1,021.62	1,297	136	1	19	9	79	62
Utah..........	5	448.12	214	40	17	2	73	3	219
Washington....	14	1,073.86	1,129	51	26	39	687	46	146
Wyoming......	2	22.00	15	5	...	...	...	...	4
Total.......	159	9,303.72	9,038	918	239	134	3,226	876	792
Total U. S. 1920	831	47,704.92	77,722	6,027	751	1,215	7,441	5,723	6,809
Total U. S. 1919	841	47,941.45	79,355	4,447	869	866	5,622	3,672	10.114

Total rolling stock, 1920.....105,588 Total rolling stock, 1919.....104,945

This year, as will be noticed, an attempt has been made to separate the "other cars" into the subdivisions mentioned above. Therefore, while the "other" cars have decreased by 3,305 cars, the service, freight and express cars have increased.

In the compilation of this year's table and its comparison with that of last year a few errors, slight in magnitude, were found in the 1919 table. In the comparative figures for the two years given above these errors have been corrected in the 1919 statistics.

Letters to the Editors

Budget Plan in Cincinnati

OFFICE OF DIRECTOR OF STREET RAILROADS

CINCINNATI, OHIO, Dec. 28, 1920.

To the Editors:

The article by Mr. Flint in the current issue of the ELECTRIC RAILWAY JOURNAL is timely. The budget plan of control under the Cincinnati franchise has had two years of trial under the most severe test that could be experienced. Up to the time of its inauguration the Cincinnati Traction Company had not adopted the Interstate Commerce Commission's system of accounting and it was installed simultaneously with the budget.

This of course involved great difficulty in obtaining data from past experience upon which to forecast the probable requirement for the next year. In addition there were sharp fluctuations in the prices of labor and materials and a change in the public works program of the city necessitated track construction on a number of streets not under consideration at the time of the preparation of the budget.

The company opposed the plan in the preparation of the ordinance and at no time had much sympathy with it. I think, however, the officers tried to gather the information as efficiently as possible considering the fact that the experience was new. In spite of these difficulties, I am confident that the results fully warrant the conclusion that the method is not only feasible but far more satisfactory and more easily understood by the public than that of the "car-mile allowance" plan.

The Cincinnati plan provides that forty-five days before the end of the year the company shall submit to the Director of Street Railroads "an estimate of gross receipts and budget of operating expenses for the ensuing calendar year, including the expenses of performing its corporate obligations and maintaining its corporate organization, setting forth an estimate of the total to be expended in the ensuing year under each of the general accounts as provided by the uniform system of accounts for electric railways prescribed by the Interstate Commerce Commission, provided, however, that during the year additional expenditures for such operating expenses may be made upon the approval of the Director of Street Railroads of supplementary estimate or estimates."

It will be seen that the budget applies to operating expenses only, since the other deductions are either specifically set forth in the ordinance or are passed upon separately by the Director of Street Railroads, to whom must be submitted the question of all issues of new securities and authority for capital expenditures.

To meet unforeseen contingencies, the supplementary allowance is provided, and in addition the Director of Street Railroads may authorize transfers from one account to the other. This gives the budget the necessary flexibility provided by monthly budgets.

The Director of Street Railroads must approve or disapprove the budget in ten days. This period is entirely too short, but provision is regarded as directory and not mandatory. Should he disapprove and the company fail to agree the matter may be determined by arbitration.

Although the sums fixed in the budget are by general accounts only, the full detail of the primary accounts is furnished and, under the ordinance, the Director of Street Railroads maintains a continuous audit and has the right to object to the purpose of any voucher. The authority, however, is far from being so complete as that of the Boston trustees. The city has no control over the personnel of the officials of the company. Some details of the actual experiences under the budget plan will point out the factor affecting it and the actual results.

In the year 1919 the actual expenses for way and structures were $111,861.10, or 24.13 per cent, more than the original budget, which was due to street improvements requiring reconstruction of tracks, not contemplated at the time the original budget was fixed. In April, 1919, a supplementary amount of $80,812, or 17.43 per cent, was authorized, and during the latter part of the year an amount of $73,000, or 15.75 per cent, was transferred to way and structures from the accounts "conducting transportation" and "traffic." The city's street improvement program was not completed. This left a balance of $41,950.90 unexpended for way and structures, which was 9.05 per cent of the original budget and 6.79 per cent of the revised estimate.

Equipment expenses increased $29,140.82, or 5.89 per cent, over the budget, principally due to increases in wages of shop employees during the year.

Power expenses were $52,663.29, or 6.19 per cent, more than the budget, attributable to increased cost of fuel and the use of an inferior quality, this situation growing out of the coal miners' strike.

The expenses under "conducting transportation" were $53,513.02, or 1.91 per cent, less than the budget, due in part to the introduction of large cars in place of small ones. During the latter part of the year an amount of $6,600, or 2.37 per cent, was transferred to way and structures, so that the account "conducting transportation" showed a net increase of $12,486, or 0.46 per cent over the original budget.

Traffic expenses were $8,570.75, or 69.68 per cent, less than the budget, of which $7,000, or 56.91 per cent, was transferred to way and structures.

General and miscellaneous expenses increased 5.89 per cent over the original budget, owing to increases in salaries of office employees, cost of printing tickets and injuries and damages.

The total operating expenses for the year were $158,582.73, or 3.12 per cent, more than the budget. Deducting the additional amount of $80,812, authorized in the early part of the year for track construction, leaves $77,770.73, or 1.53 per cent, over the original budget and 1.51 per cent over the revised estimate.

For the first nine months of 1920 way and structures expenses were $38,197.69, or 9.44 per cent, less than the budget. This amount will probably be reduced during the remaining months of the year, as there are several large pieces of track under reconstruction.

Equipment expenses increased $90,805.83, or 20.70 per cent, of which $67,642.35, or 15.42 per cent, is for depreciation of new cars and $7,500, or 1.71 per cent, for increases in wages of shop employees, which were not taken into consideration when the original budget was fixed. This leaves an increase of $15,663.48, or 3.57 per cent.

Power expenses were $162,041.89, or 22.38 per cent high, principally due to the increased cost of coal and increased consumption owing to the receipt of inferior quality purchased from companies other than those delivering coal under contract.

Conducting transportation increased $208,856.71, or 9.96 per cent, of which $135,000, or 6.44 per cent, is attributable to the increase in wages granted employees, effective July 1, 1920, which could not be foreseen in 1919. This leaves an increase of $73,856.71, or 3.52 per cent.

Traffic expenses decreased $1,706.82, or 22.99 per cent, principally due to a decrease in advertising.

General expenses were $1,298.70, or 0.33 per cent, more than the budget, the excess consisting of various small amounts.

The total operating expenses for the nine months of 1920 increased $427,598.62, or 10.60 per cent, over the original budget. Taking into consideration the items enumerated above reduces this amount to $97,317.68, or 2.39 per cent.

It is therefore evident that under normal economic conditions an annual forecast within 3 per cent of the actual could be attained even in the absence of very complete data as to past performances. With the experience that each succeeding budget will afford this variation should be materially improved.

W. C. CULKINS, Director.

Railway President Favors Budget System

THE UNITED RAILWAYS & ELECTRIC COMPANY
OF BALTIMORE

BALTIMORE, MD., Dec. 29, 1920.

To the Editors:

I have read with much interest the article by Mr. Flint appearing in the Dec. 25 issue of the ELECTRIC RAILWAY JOURNAL on the budget system. This article interests me particularly because I established this system on the Boston Elevated when general manager of that property. The system was originally used by the writer when general manager of the Chicago, South Bend & Northern Indiana Railway and later on the Boston & Worcester Street Railway. It is now in use by the United Railways & Electric Company of Baltimore.

Our procedure is as follows: On or before the twentieth of a given month the actual figures for the succeeding month of the preceding year are given to the heads of departments. On or before the twenty-fifth of the month the department heads submit to the auditor their estimated requirements for the coming month. The auditor, in consultation with the president, works up the controlling sheet, estimating as nearly as possible the revenue expected to be obtained. They then estimate such expenditures as they feel can be allowed, meeting, if possible, the estimates of the department heads, but requiring that these estimates be cut if necessary to meet the income.

At an officers' meeting held prior to the first of the month, the estimates and allowances are distributed to the several heads of departments, and the question of the allowances is discussed. About the fifteenth of the month department heads are expected to check up their expenditures to determine whether the allowances are being conformed to. At the same time the receipts are checked up, and if it is found that these are not likely to reach the original estimates a further cut in the budget allowances is made and department heads are expected to meet this during the balance of the month.

After working under this system for the past ten years we feel that it is a great help in working out the financial problems of a company.

C. D. EMMONS, President.

Association News

Committee of 100 Members Appointed

GENERAL GUY E. TRIPP, chairman of the Committee of One Hundred, has announced the personnel of the executive committee of the Committee of One Hundred, as follows:

H. L. Stuart, Halsey Stuart & Company, Chicago, Ill.

Randal Morgan, vice-president United Gas Improvement Company, Philadelphia, Pa.

Arthur W. Brady, president Union Traction Company of Indiana, Anderson, Ind.

Thomas N. McCarter, president Public Service Railway Company, Newark, N. J.

Colonel Philip J. Kealy, president Kansas City Railways Company, Kansas City, Mo.

S. M. Curwen, president J. G. Brill Company, Philadelphia, Pa.

P. H. Gadsden, vice-president United Gas Improvement Company, Philadelphia, Pa.

O. B. Willcox, vice-president Bonbright & Company, New York, N. Y.

Barron Collier, president Barron G. Collier, Inc., New York, N. Y.

Lucius S. Storrs, president The Connecticut Company, New Haven, Conn.

Francis H. Sisson, vice-president Guaranty Trust Company, New York, N. Y.

O. D. Young, vice-president General Electric Company, New York, N. Y.

J. K. Choate, vice-president the J. G. White Management Corporation, New York, N. Y.

J. H. Pardee, president the J. G. White Management Corporation, New York, N. Y.

James D. Mortimer, North American Company, New York, N. Y.

Britton I. Budd, president Metropolitan West Side Elevated Railway, Chicago, Ill.

James H. McGraw, president the McGraw-Hill Company, Inc., New York, N. Y.

Guy E. Tripp, chairman board of directors Westinghouse Electric & Manufacturing Company, New York, N. Y., chairman.

Section in Virginia Reorganized

AT A MEETING held on Dec. 17 the employees of the Newport News & Hampton Railway, Gas & Electric Company reorganized their company section, and judging from the large and enthusiastic turnout they intend to make it a big thing on the Peninsula. J. N. Shannahan, president of the company, explained the purposes of the organization, and H. W. Cox, secretary of the Industrial Y. M. C. A., spoke on welfare work.

E. M. Braxton, attorney for the company, also addressed the section, treating of the employee as the point of contact with the public and the results accruing from the impressions made at this point.

The following officers were then elected: President, E. C. Kelly; vice-president, H. C. McAllister; secretary, J. W. Howard, and treasurer, H. W. Daughtry.

Recent Happenings in Great Britain

Tramway Situation Critical, with Men Demanding Wage Advances and Limit About Reached in Fare Increases

From Our Regular Correspondent

The details given in a report to the British Joint Industrial Council for the Tramway Industry, an abstract of which is included in this letter, show that the industry is in quite as perilous a condition as was the American electric railway industry not long ago. In the face of the new demand for higher wages, the ominous thing is that in many cases it is believed the critical point has been reached, in that further increases of fares will not produce increased revenue. It is not surprising that the tramway companies withdrew from all further negotiations, and that the municipalities refused arbitration. They simply say that they can not pay more. The tramway-operating municipalities have the rates (local taxes) to fall back upon as a last resort, but the companies have no such resource. They are also in many cases suffering from Government delay in granting them authority to increase their statutory maximum fares. Such increase, as indicated above, is often only a forlorn hope.

No settlement has been reached in regard to the demand from the tramway workers of Great Britain for a further increase of wages of 12s. a week. A month ago I mentioned that when the claim originally came before the National Joint Industrial Council for the Tramway Industry the representatives of the tramway companies withdrew from the Council on the ground that they were unable to pay any further increase. The representatives of the municipal tramway undertakings and of the employees decided to continue negotiations and that their secretaries should carry out an investigation regarding wages, the cost of living, and the financial position of the undertakings. The report by the secretaries was issued on Nov. 13. It revealed a serious state of affairs. To a questionnaire sent out, eight-one municipal tramway authorities employing 47,273 men replied. On Oct. 1, when the cost of living had risen 164 per cent above the pre-war scale, the increases of wages which had been granted amounted to: Drivers, 132 per cent; conductors, 147 per cent; car repairers, 140 per cent; car cleaners, 163 per cent. The working week had been reduced from sixty hours to forty-eight hours.

EARNINGS PER CAR MILE INCREASE

As to receipts per car mile, in 1913-14, forty-seven undertakings earned not more than 11d. per mile run. In 1919-20 there were sixty-one undertakings which earned not less than 18d. per car mile. In September and October, 1920, no undertaking earned less than 15½d. per car mile and only seventeen earned less than 20d. per car mile. Nothwithstanding the increase in receipts, the expenses had gone up so much that the tramway industry of the whole country was being carried on at at loss of at least £1,556,000 during the last financial year.

The application now made for increased wages would involve a further wages charge of about £1,481,000, equal to 1.59d. per car mile. Taking the current financial year, the estimated loss on working was £3,310,000, and with the additional charge now demanded the loss would be £4,793,000. The actual revenue at present was 3.55d. per car mile less than the expenditure, and with the new demand it would be 5.14d. This was a condition of affairs under which no industry could survive. Out of ninety-eight local authorities working tramways, down to Oct. 26 twenty-five had applied to the Ministry of Transport for orders to increase their statutory maximum charges.

This report came before the Joint Council on Nov. 17. The employers' representatives were of the opinion that whatever increased fares might be charged no increased revenue would result as the economic limit had been reached. They therefore declared that they were unable to accede to the wage application or any part of it. The trade union representatives then proposed arbitration and the meeting was adjourned to allow the opinion of all municipal tramway authorities to be taken on the proposal.

The Joint Council met again on Dec. 7, when all negotiation broke down. It was reported, as the result of the referendum, that the majority of the municipal tramway authorities in the country would not consent to submit the wage claim to arbitration because if any advance in wages was granted by an arbitrator they could not afford to pay it. No local authority was in favor of the advance, though a minority of them would have agreed to arbitration. As soon as this result was announced, the meeting of the Council broke up.

At the time of writing the prospect is that there will be no general tramway strike, as it has been made abundantly clear that strike or no strike the concession cannot be granted, for the money for the purpose does not exist. The municipal undertakings do not intend to give advances which would have to be charged on the rates (local taxes), and the companies have no funds for the purpose. It is something gained that a dead-end has at last been reached, and if the employers now stand firm in their present position there will be no further increases of wages.

An impudent attempt by Edinburgh tramway employees to dictate to the management has failed. The men put an embargo on passengers standing in the cars, basing their action on an old regulation of the horse-car days. Their object evidently was to require the use of more cars and more men. The Town Council, which owns and works the tramways, stood firm and threatened the men with dismissal. The public were put to great inconvenience during the rush hours. As the men had not submitted any grievance for consideration by the Joint Industrial Council for the industry, the Town Council resigned from that organization.

MEN TAKE ARBITRARY STAND

On Nov. 15, following the dismissal of several men who persisted in refusing to allow passengers to stand, the employees went out on strike. On the following day the manager was able to run a limited service, and on Nov. 17 the strikers returned to work. In doing so they acted on the advice of the local trades council. In this they showed wisdom, as the Town Council and the management were absolutely firm and were prepared to engage as many new men as necessary. Applicants for the jobs were plentiful.

Mr. Pick and Mr. Shave, of the London General Omnibus Company, in their paper on motor omnibus working and possibilities, presented at the recent congress of the American Electric Railway Association, referred to the fact that a new and enlarged type of omnibus was about to be tried in London. The first of these vehicles was put on the streets during November for trial and demonstration trips. This "S type" 'bus is 24 ft. 7 in. long, 12 ft. 3 in. high, 7 ft. 1 in. wide, and has a wheel base of 14 ft. 11 in. The engine is similar to that used on existing omnibuses. It develops 34 hp. when running at 1,000 r.p.m. The important point is that the body has been designed to seat fifty-seven passengers—twenty-nine inside and twenty-eight on the roof—thus rivalling a tramcar in capacity. The previous type seated forty-six, and the one before that thirty-four. The weight unloaded is slightly increased, but the body is only 2 ft. 2 in. longer than that of the forty-six-seater.

OMNIBUS BILL LOST

Disaster has once more overtaken the efforts of the London County Council to get Parliamentary powers to run omnibuses. The bill for this purpose was passed by the House of Commons, but when the bill came before a committee of the House of Lords in the latter part of November the London General Omnibus Company renewed its determined opposition to the matter and contended that if there was any need for the proposed omnibus services they would supply it. The Lords' committee declined to sanction the proposal in the bill.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Reply on Lease First

Detroit United Railway Indicates City Must Answer that Proposal Before Sale Is Discussed

In reply to the communication from the officials of the city of Detroit, Mich., asking the Detroit United Railway to name a price at which it would sell certain of its lines to the city, Elliott G. Stevenson, attorney for the company, replied that until the city officials deal with the proposition which the company has already submitted, namely, that of leasing the entire system, the company did not care to enter into any further negotiations.

Service-at-Cost Plan Vote

The statement is repeated that the company will not enter into any agreement that would either directly or remotely recognize the claimed right of the city to proceed to acquire a municipal railway system under the proceedings culminating in the election of April 5. The company could not be so inconsistent as to enter into negotiations to sell the city part of the lines while challenging the validity of the proceedings and the right of the city to proceed to acquire a municipal system.

It is the purpose of the company to submit to the electors of the city at the approaching April election an initiated ordinance providing for a so-called service-at-cost operation of the street railway system under municipal supervision and regulation along the lines of the ordinance submitted according to the requirements of the City Charter, nearly a year ago to the Corporation Counsel for approval as to form.

The railway, Mr. Stevenson states, is most anxious to reach a solution of the difficulties that prevent the public having adequate transportation, but it has exhausted everything that could be thought of with a view to bringing about that result.

Company Operating at Loss

If the lease proposal is rejected there remains nothing for the company to do but to submit an ordinance to the people for ratification that will finally settle the question and insure the people the kind of service they need and are entitled to.

Mr. Stevenson states that inasmuch as the commission has had auditors in its office for more than six months with the company's consent checking receipts and expenditures on account of operation, etc., the commission has probably been advised as to the fact that the operations of the company's city system are being conducted at a loss. This situation influences the company to say that no proposition will be taken up other than the one submitted at the present time. If that is not accepted, the company will, it is stated, be compelled to take the other step indicated, and in the meantime ask the Court to fix in the pending proceedings before Judge Jayne an increased rate of fare—probably 6 cents with 1 cent for a transfer—to enable the company to operate without loss. Existing conditions impel the company to have the negotiations that are now pending brought to an early conclusion.

In reply the Street Railway Commission has repeated the request that the Detroit United Railway put a price on the lines which the city would take over. The company maintains that no different answer can be given to this request than was given at first.

Following the refusal of the company to set a price at which it would sell these lines, and the letter to the Street Railway Commission saying that the company was losing money, a letter was sent to the heads of the unions announcing the company's intentions to reduce wages of the platform men, effective on Jan. 1.

As was indicated in the Electric Railway Journal for Dec. 25, this proposal was rejected at a business meeting of the membership of the three locals and copy of the resolution adopted was placed in the hands of E. J. Burdick, assistant general manager for the Detroit United Railway, by Carey Furgeson, business agent for Local 26.

New Orleans Strives for Permanent Settlement

Eight-Cent Fare Will Be Effective Until Next April—Announcement of Policy Expected Jan. 15

Opponents of the increased fare in New Orleans, La., are busily engaged in an effort to have the ordinance granting the increase repealed and the old rate of fare re-established. The attacks on the measure are annoying, but they have little prospect of success. The ordinance as adopted by the Commission Council authorized the company to increase fares from 6 cents to 8 cents. It will not expire until April 22, 1921. At that time the fare will automatically go back to the old rate of 6 cents, and the workmen's wages back to the old scale.

This ordinance was adopted by the Commission Council in lieu of the cost-plus plan recommended by the Special Masters, in order to enable the company to meet the demands of the striking employees and to provide funds needed by the company to meet increase in operating expenses caused by higher taxes and advances in the cost of fuel.

The Council approved the increase for a period of six months, during which time it was recommended that the receiver of the company would formulate some plan of action for his future guidance.

One movement to repeal the measure has just received a solar plexus blow. This was a suit brought in the Civil District Court by certain taxpayers of the city to enjoin the Commission Council from authorizing collection of the 8-cent fare. An injunction had been issued by Judge Foster, of the Federal Court, to prevent any interference with the receiver in the 8-cent fare. Counsel for the taxpayers maintained that the action was not against the receiver but against the Commission Council, which was, he alleged, without authority to grant the increase, as the franchises of the several companies embraced in the New Orleans Railway & Light Company specifically fixed the rate of fare at 5 cents.

Judge Fred D. King, of the Civil District Court, in refusing to interfere with the order of Federal Judge Foster declared that the comity existing between the State Court and the Federal Court required him to respect the injunction issued by Judge Foster preventing interference with the collection of an 8-cent fare. In deciding the case, Judge King declared the essential grounds for the nullity of the 8-cent fare ordinance were decided adversely to the taxpayers by the State Supreme Court in a similar suit brought by Black and others against the railways when the fare was increased from 5 cent to 6 cents. In this case, Judge King said, the higher court held that the taxpayers, not having been parties to the contract between the city and the railways, had no legal interest in the matter and, as taxpayers, had no right to interfere or bring the suit.

Counsel for the taxpayers declared, after the decision, that he would make application for a re-hearing and if this were refused, an appeal would be taken to the State Supreme Court.

Another movement looking to the

repeal of the ordinance was by referendum. This campaign was very energetically pursued by a number of influential gentlemen, taxpayers of this city, one of whom was formerly president pro tem of the Senate. The law under which they sought to repeal the ordinance required the sworn affidavits for repeal of 30 per cent of the registered voters of the city. Under the present registration this practically amounted to an election almost, as they will be required to get the petitions of at least 25,000 voters.

They have obtained, so far, by the hardest kind of work and a most strenuous campaign, only 20,000 petitions, so that they still lack 5,000 votes of the goal.

The Commissioner of Public Utilities of the newly elected Council declares that he is studying the situation with the view of settling the railway matter, but is not yet ready to express his views. The Association of Commerce has also taken the matter up and is about to adopt general rates to guide it in its deliberations and to map out a plan of procedure.

The New Orleans *Times-Picayune*, in a long editorial, urges the new city administration to get to work quickly on some plan that will solve the railway matter. It maintains the time for action is short and that it is distinctly to the interest of New Orleans to see that the following ends are obtained:

1. The railway in the hands of a management possessed of the public's confidence.
2. The public paying a fare which it is convinced is no more than the costs of wise operation and sound capital make necessary.
3. The corporation earning a legitimate return upon a capitalization which the community knows is likewise legitimate.
4. The employees content with their work and wage and assured of permanent positions.

It is said the receiver is working diligently with the operating management of the company toward the desired end but that no announcement of policy will be made before Jan. 15. The complaint is made that the 8-cent fare which was expected to yield $1,500,000 annually will not show a greater revenue than $1,300,000. The loss of revenue from short hauls has exceeded expectations.

Reorganization of International Association

The International Street & Interurban Railway Association, with headquarters at Brussels, has just issued a circular explaining that certain objections had been raised to the proposed reorganization of the association. The reorganization proposed was to dissolve the association and then immediately reorganize it with a membership confined to countries which participated on the allied side or were neutral during the recent war.

The objections which were raised to this plan were that such a procedure would be illegal under the Belgian law unless a referendum was taken of all of the former members of the association. To this point the officers of the association reply that a general statute authorizing such action is now under consideration in the Belgian parliament and the proposed action will be taken after the passage of this act.

Although the association has lost many members, particularly in Russia, its membership now numbers 250. The association had hoped to hold a meeting in Brussels this year, but the plan had to be abandoned because of the difficulties of traveling for those residing at a distance from Belgium.

Toledo Candidates Narrowed

Only Three Names Remain in the Race for Railway Commissionership—Railway Man Considered

The board of sinking fund commissioners of the city of Toledo, Ohio, is considering at present several names as possible appointees to the board of directors of the new Community Traction Company, one of the members of which is to be selected by that body to represent the city.

Under the provision of the service-at-cost ordinance for retiring bonds of the company common stock is issued to the city as each unit of bonds is retired. As it acquires common stock ownership of the railway the city will be represented on the board of directors. The membership of the board is five at present. Four of these members will be company representatives.

COMMISSIONER'S SALARY PROBABLY $10,000

It is thought the sinking fund commissioners will name one of their own number or a member of the board of control. At the meeting on Dec. 28 the board decided to ask Mayor Cornell Schreiber for a legal opinion on the duties and qualifications of the man to be appointed.

The sinking fund commissioners are Edward Kirschner, vice-president of the Ohio Savings Bank & Trust Company; Rollin H. Scribner, manager of the investment department of Secor, Bell & Beckwith; W. Lockwood Lamb, cashier of the National Bank of Commerce; and Johnston Thurstin, attorney.

Mr. Thurstin was a member of a street railway commission which at one time drafted a community ownership solution for the settlement of the traction problem.

At a meeting of the street railway board of control last Monday it was decided that a practical street railway man would probably be the choice of the board for transportation commissioner. It was also decided that his salary would probably be $10,000 a year. The selection has narrowed down to about three of the dozen or more applicants. The appointment will probably be announced about the middle of January, members of the board declared.

It is thought now that the legal work of separating the railway property of the Toledo Railways & Light Company, from all of the company's many other interests will be completed so that the transfer to the new system of operation may be made about Feb. 1.

Wage Conference Planned

Full and Frank Discussion of Reduction of Trainmen's Pay Planned at Detroit

A communication sent to the officials of the Detroit (Mich.) United Railway after W. D. Mahon, international president of the amalgamated, had conferred with executives of the union on the proposed reduction of approximately 20 per cent in the wages of the platform men, signified that the men were willing to meet the company officials to discuss the subject. Their refusal to accept the lowered scale of pay was repeated.

MEN QUESTION REDUCTION IN COSTS

In the letter in answer to the Detroit United Railway's request that the men meet the company to discuss the wage question further, it was stated that members of the union were fully informed as to the facts when they voted against accepting the proposed cut in wages. The comments of E. J. Burdick, assistant general manager of the railway, relative to living costs and street railway men's wages during the war period are questioned by the men.

The company maintains it is unfair that car riders while submitting themselves to cuts in wages and working hours should be asked to pay an increase in the rate of fare in order that the motormen and conductors alone should be gainers. Moreover, the company has been quite seriously affected by the changed economic conditions.

Exception is taken to the company's statement that prices of food stuff, clothing, shoes and household furnishings have fallen to such an extent that present necessities can be met with a decreased wage scale. The men claim that the present scale is required as a minimum.

The company states that salaries of the executive officers have been voluntarily reduced, effective the first of the new year. At a meeting of the heads of the departments it was decided that salaries and wages all along the line are to be decreased. The public has been informed of the steps being taken to reduce the wage scale of conductors and motormen throughout the system to a level more in hormony with not only the decrease in living cost but comparative with the wage scales being adopted in other fields of labor.

AMICABLE ARRANGEMENT EXPECTED

The company expresses the hope that the employees will, after thoughtful deliberation, realize that it is only proper that they, too, cheerfully accept a reduction in the wage scale because such reduction is inevitable under existing conditions.

Willingness to meet and discuss any subject that is of interest to the men and the company is expressed by the men. It was repeated that they were ready for a full and frank discussion of the matter.

Removal of New Jersey Commissioners Sustained

Ousting of the Board of Public Utility Commissioners by Governor Edwards of New Jersey for "misconduct and neglect of duty" was upheld on Dec. 27 by the Supreme Court in an opinion handed down at Trenton. The decision overruled a demurrer filed by the board. It upholds the constitutionality of the section of the public utilities law giving the Governor power to remove from office upon charges and holds that in conducting the proceedings provided by law the Governor is not bound to observe any particular form so long as the proceedings are substantially in compliance with the statute.

The practical effect of the decision, unless reversed on appeal, is to remove from office President John W. Slocum, Andrew Gaul, George F. Wright and Harry L. Knight, who have continued to exercise the functions of public utility commissioners notwithstanding their removal from office by the Governor, whose appointment of new commissioners has not been acted upon by the Senate.

Immediately upon receiving word from Trenton that the Supreme Court had upheld the Governor Josiah Stryker, of Lindabury, Depue & Faulks, who represented the utilities commissioners in the ouster proceedings, stated that an appeal would be taken to the Court of Errors and Appeals.

The nominees of the Governor for the new board are: James A. Hamill, of Jersey City; Treadwell Cleveland, of Newark; former State Senator James A. C. Johnson, of Englewood; State Highway Commissioner Walter F. Whittemore, of Newton, and Arthur A. Quinn, of Perth Amboy, president of the State Federation of Labor.

Permanent Reconstruction Urged

In a letter to the City Council, D. W. Henderson, superintendent of the Seattle (Wash.) Municipal Railway, makes an urgent plea for the permanent reconstruction of the paving on First Avenue and First Avenue South and the rebuilding of the railway tracks at an estimated cost of $350,000. Mr. Henderson declared that operation of the municipal lines over the street between Pine Street and Atlantic Street was virtually impossible, owing to the destructive effect of the bad tracks on the rolling stock.

Mr. Henderson advised that temporary repairs to improve the tracks would cost $21,225, if made now, and would have to be done over again in two or three years, unless the entire street was repaved and new tracks laid. It was pointed out that the cost of repairs and financial loss to rolling stock due to breaking of truck frames on sagging rail joints, and injury to the whole cars from the constant jarring was excessive. Mr. Henderson's letter was referred to the streets and sewers and utilities committees.

News Notes

Miami a Prospective Buyer.—The Miami (Fla.) Traction Company is preparing to sell all its railway equipment to the city. The company has not operated its lines since Oct. 19, when a fire occurred which destroyed the carhouse and all the cars. The company operates 5 miles of single track. It has a capital stock of $250,000.

Gretna-Algiers Men Return to Work.—The platform men of the South New Orleans Light & Traction Company, New Orleans, La., who struck recently for a wage increase voluntarily returned to work on Dec. 24 at the old wage scale of $96 a month. A new agreement was entered into between the men and the representatives of the union whereby the old pay scale will obtain until Dec. 24, 1922, unless in the meantime the Jefferson officials authorize the railway to increase its fare. In that event the wage demands of the men will be adjusted. The company's petition for an advance in fares was rejected recently by the police jury of Jefferson Parish.

Charges Quashed.—Charges pending against Julius Caesar Jackson, Edgar C. Kerwin and William Ems, former employees of the United Railways, St. Louis, Mo., in connection with the loss of United Railways referendum petitions in June, 1918, have been *nolle prossed* by Assistant Circuit Attorney F. E. Williams at St. Louis. The cases were dropped by the Circuit Attorney's office because of the ruling of the Circuit Court at Springfield, Mo., during the trials of Richard McCulloch and Bruce Cameron to the effect that the referendum petitions had no value, hence could not be the objects of larceny. It had been anticipated that these cases would be dismissed.

Municipal Undertaking in Greenville.—Citizens of Greenville, Tex., in a referendum election on Dec. 18 voted to retain the city railway system and to operate it under municipal ownership. The property had been purchased by the city and there had been much agitation over the question of a municipally-owned automobile bus line to take the place of the railway. It was proposed to junk the line and equipment of the traction company and sell it for whatever it would bring and then to invest the proceeds in an automobile bus line, but the bus line proposition was rejected in the referendum and the railway will be retained. Greenville is the only city in Texas which owns its railway system.

Paving Question an Issue in Aberdeen.—Permission granted to the Grays Harbor Railway & Light Company, Aberdeen, Wash., to use planking instead of paving certain street trackage in the city has been withdrawn by the City Council, following protests by property owners on Curtis Street, who contend that the company should stand street improvement expenses exacted of individual tax payers. The matter has been before the Council on two occasions. The latest development is a resolution adopted by the Chamber of Commerce, asking the city to re-issue the permit on the ground that the expense of regulation paving would prove a hardship on the company in its present financial condition. When asked to pave Curtis Street trackage to conform to other streets the railway filed a demurrer, alleging that the profits of the company for the past year had been small, and that the work could not be afforded.

Shopmen and Other Mechanics Seek Increase.—Col. A. T. Perkins, general manager under the receiver of the United Railways, St. Louis, Mo., has filed a number of exhibits with the Missouri Public Service Commission tending to show that the company is now paying its shopmen, electrical workers, painters, carpenters, bridge and structural iron workers, as high wages as the average paid in St. Louis. The employees enumerated are seeking an increase in wages of 45 per cent. All the rates requested are based on an eight-hour day with double pay for overtime and a half day off Saturday. The electrical workers are now working on a twelve-hour basis. Sixty cents an hour is the lowest rate asked and $1 an hour is the highest. A former order of the court permits the State Public Service Commission to act as a board of arbitration in wage disputes. It is on the assumption that they will act in this case that the petitions have been filed.

Children "Kidded" in Vancouver.—The children of the office employees of the British Columbia Electric Railway, Vancouver, B. C., jammed the head office building of the company on the afternoon of Dec. 18 at the second Christmas entertainment held by the office employees' association of the company. Santa Claus arrived through the chimney and, with the help of Mrs. George Kidd, wife of the general manager of the company, distributed presents to every one of the 300 youngsters who filled the fourth floor of the building. There were four Christmas trees laden with presents. A fund of $350 was raised by popular subscription from the office staff, to which the management of the company contributed generously. Then a committee bought presents for every child whose name was obtainable. Taking an active part in the festival also were George Kidd, general manager; W. G. Murrin, assistant general manager, other company officials and Mrs. Murrin. The festivities for the day were concluded with a dance for the older members of the official family of the company, including the employees.

Financial and Corporate

Big Gain in Net Income

West Jersey & Seashore Railroad Changes from Deficit of $85,000 in 1918 to a Profit of $10,000 in 1919

The financial report of the West Jersey & Seashore Railroad for the year ended Dec. 31, 1919, showed a remarkable increase in all items. The revenue from the operation of the railway was $11,971,021. This in comparison with $10,599,543 in 1918 showed an increase of $1,371,478, or 12.9 per cent. Railway operating expenses increased to $11,145,020. This was an increase of $1,039,160, or 10.3 per cent, over 1918. In 1919 the net operating revenue was $826,001, which, in comparison with $493,683 in 1918, shows an increase of more than 67 per cent With this increase in net operating revenue, the taxes being increased only about 19 per cent, the operating income for 1919 increased to $245,968, or more than thirty-three times as much as in 1918.

The net income transferred to profit and loss, according to the income statement of the federal operation, was changed from a deficit of $85,369 to a profit of $10,958, or a betterment by 112 per cent.

As previously mentioned, the West Jersey & Seashore Railroad was under federal control and the annual compensation paid for the possession, use and control of the property was $952,682. This sum, together with other corporate income, gave a gross income for 1919 of $1,212,433, or an increase over 1918 of 12.2 per cent. The net income, according to the income statement of the West Jersey & Seashore Railroad was $698,859, an increase of only 1.8 per cent. This increase allowed a balance of $22,877 to be transferred to profit and loss for 1919. In 1918 only $13,412 was transferred, so an increase of 70.6 per cent was registered in 1919 in comparison with 1918.

14,762,658 REVENUE PASSENGERS

The total revenue passengers carried in 1919 were 14,762,658, or an increase of 1.1 per cent over 1918. The passenger revenue increased by 17 per cent, the revenue for 1919 being $7,563,634. This increase in revenue was due to the fact that the average revenue per passenger increased from 44.3 cents in 1918 to 51.2 cents in 1919. This was an increase of 6.9 cents, or 15.5 per cent.

INCOME STATEMENT OF THE FEDERAL OPERATION OF WEST JERSEY & SEASHORE RAILROAD

Year ended Dec. 31	1919	1918	Percentage Change Over 1918
Revenue from transportation	$11,712,816	$10,398,401	+12.6
Revenue from other railway operations	258,205	201,142	+28.4
Total railway revenue	$11,971,021	$10,599,543	+12.9
Way and structures	$2,314,978	$2,511,140	—7.8
Equipment	2,443,484	1,920,826	+27.2
Traffic	98,811	91,905	+7.5
Conducting transportation	5,961,368	5,284,564	+12.8
Miscellaneous operations	66,676	58,526	+13.9
General	260,165	238,912	+8.9
Transportation for investment—credit	462	13	......
Total railway operating expenses	$11,145,020	$10,105,860	+10.3
Net operating revenue	$826,001	$493,683	+67.3
Taxes assignable to railway operations	$578,874	$483,383	+19.7
Uncollectable railway revenues	1,159	3,159	—63.3
Expenses assignable to railway operations	$580,033	$486,542	+19.2
Operating income	$245,968	$7,141	+33.40
Deductions from gross income:			
Net hire of equipment — Dr. balance	$94,558	$32,799	+188.2
Net joint facility rents — Dr. balance	156,805	143,262	+9.5
Net miscellaneous income — credit	16,354	83,551	—80.3
Total deductions from gross income	$235,009	$92,510	+153.9
Net income transferred to profit and loss	$10,958	*$85,369	+112.7

*Deficit

INCOME STATEMENT OF WEST JERSEY & SEASHORE RAILROAD

Year ended Dec. 31	1919	1918	Percentage Change Over 1918
Compensation accrued under federal control for possession, use, and control of property of this company	$952,682	$952,682	....
Other corporate income	259,751	137,509	+88.9
Gross income	$1,212,433	$1,090,191	+12.2
Deductions from gross income	513,574	403,471	+27.5
Net income	$698,859	$686,720	+1.8
Disposition of net income	$675,982	$673,308	+0.4
Balance transferred to profit andl oss	$22,877	$13,412	+70.6
Total amount to credit of profit and loss	$408,977	$375,938	+8.8

STATISTICAL INFORMATION — WEST JERSEY & SEASHORE RAILROAD

Year ended Dec. 31	1919	1918	Percentage Change Over 1918
Miles of single track	361.18	361.18	....
Train miles:			
In passenger service	3,129,331	3,017,431	+3.7
By freight service	474,060	604,542	—21.6
Total revenue mileage run	3,603,391	3,621,973	—.5
Revenue passengers carried	14,762,658	14,603,466	+1.1
Passenger revenue	$7,563,634	$6,464,198	+17.0
Passenger revenue per cent of total operating revenue	63.18	60.99	+22
Passenger revenue per miles of line	$20,941	$17,897	+17.0
Average revenue per passenger (cents)	51.2	44.3	+15.5
Average miles each passenger was carried	26.70	25.13	+6.2
Average number of passengers per car-mile	29	31	—6.5
Statistics per train mile:			
Operating revenue	$3.32	$2.93	+13.3
Operating expenses	$3.10	$2.79	+11.1
Net operating revenue (cents)	22.9	13.6	+68.3
Number of passengers	4.10	4.03	+1.7
Train miles per revenue passenger	0.244	0.248	—1.6
Operating ratio (per cent)	93.2	95.4	—2.2

Suburban Line Threatens to Suspend

The Syracuse & Suburban Railway, which operates between the town of Manlius and the city of Syracuse, N. Y., will cease to operate unless something is done to reduce operating expenses and overcome burdensome franchise obligations.

C. Loomis Allen, vice-president of the road, consulted recently with John J. Stanley, Cleveland, the president of the company, about the situation. Subsequently he said the fate of the Syracuse & Suburban Railway was up to the people.

Letters telling of the tenative plans to suspend operations were forwarded to the town and village officers of Manlius, Fayetteville and Dewitt, stations on the suburban line, which supply the chief sources of revenue.

Various suggestions have been made by village officials and by citizens of the city of Syracuse, among them one to the effect that the salaries of the officers of the road be reduced. Mr. Allen said:

> The matter is in the hands of the people. It is very simple. We are very barely earning our taxes and cannot increase our revenues. Fares are too high now. The only solution is to reduce expenses and the only way to do that is to get relief from burdensome franchise obligations and operating costs.

It has been intimated that bus line service will be established between the towns and city if the railway service is suspended. Mr. Allen stated that the company would voice no opposition to such action.

Included in the system of the Syracuse & Suburban Railroad are 18.5 miles of line.

$34,674,000 Cut in Capitalization

Financial Readjustment Without Foreclosure Approved by Commission to Permit United Railroads to Meet Its Obligations

An order signed by the California Railroad Commission on Dec. 22 approved the reorganization plan for the United Railroads, San Francisco, Cal., proposed by the committee named to study the affairs of the railway. If the plan is carried out the present outstanding bonds, notes and stocks will be reduced from $82,190,600 to $47,516,000, or $34,674,000. The indebtedness will be reduced from $39,242,000 to $15,366,000, or $23,876,000. The capital stock will be reduced from $42,948,600 to $32,130,000, or $10,798,600. The annual interest charges will be reduced from approximately $1,815,000 to $820,300, or $994,700.

THE plan which has met with the approval of all but holders of $603,000 of bonds, or 99.199 per cent of the security holders, calls for taking over of the United Railroads by the Market Street Railway and the issuance by the Market Street Railway of the following securities:

5% bonds due Sept. 1, 1924	$10,166,000
6% notes due Sept. 1, 1924	5,200,000
6% prior preference stock	11,750,000
6% preferred stock	5,000,000
6% second preferred stock	4,700,000
Common stock	10,700,000
Total	$47,516,000

The primary reason for the reorganization is given by the Railroad Commission in its review of the plan as inability by the United Railroads "to pay matured bonded indebtedness and interest on outstanding indebtedness."

The bonded and note indebtedness of the United Railroads is as follows:

Bonds	Amount Outstanding
Market St. Cable Co. 6s	$1,800,000
The Omnibus Cable Co. 6s	2,000,000
Ferry and Cliff House Co. 6s	400,000
Sutter St. Ry. Co. 5s	1,000,000
Market St. Ry. Co. 5s	6,641,000
United R. R. 4s	23,500,000
S. F. Elec. Ry. 5s	191,000
Gough St. R. R. Co. 5s	45,000
Total	$35,577,000
Notes	
Seven per cent	$1,925,000
Six per cent	740,000
Five per cent	1,000,000
Total	$3,665,000
Total bonds and notes	$39,242,000

The bonds of the San Francisco Electric Railways, $191,000, will be paid for in cash according to the reorganization plan, as will also the bonds of the Gough Street Railroad, amounting to $45,000. The $6,641,000 of Market Street Railway 5 per cent bonds will remain outstanding.

There are $23,500,000 of 4 per cent United Railroads bonds outstanding. Under the reorganization plan, the holders of these bonds will receive 15 per cent in Market Street Railway 5 per cent bonds, 50 per cent in prior preference stock, 5 per cent in preferred stock, 10 per cent in second preferred stock and 20 per cent in common stock.

The holders of United Railroads notes and stock totaling $46,613,600, will receive of Market Street Railway Company $3,625,000 preferred stock, $2,550,000 second preferred stock and $6,000,000 common stock.

The commission points out that in 1918, the United Railroads reported railway operating revenues of $7,510,894; operating expenses $5,031,683, giving a net operating revenue of $2,479,210. Deduction of taxes amounting to $408,000 left $2,071,210, as operating income. In 1919 the operating income was $2,054,397, the taxes amounting to $468,800. The 1919 operating revenue was $8,629,347; operating expense, $6,106,149; net operating revenue, $2,523,197.

Both the United Railroads' engineers and the commission's engineers filed an appraisal of the properties. A. L. Black, for the company, fixed $60,090,893 as the reproduction cost new of the properties as against the commission's appraisal of $51,856,218, a difference of $8,234,675. Against the commission's appraisal of reproduction cost new, less depreciation, of $41,424,961, the company gives $52,210,195, a difference of $10,765,234. The commission's figure of $30,806,514, historical cost new, is $5,023,878 less than Mr. Black's figure under the same heading.

These differences are due to the use of different unit prices and to direct and overhead allowances. All appraisals are as of June 30, 1920. In estimating the reproduction cost new both the commission and the company assumed a three-year construction period and applied to the inventory what they regarded as average prices for the three-year period ending June 30, 1920. In arriving at the historical cost effect was given by the commission to the prices prevailing at the time the properties were built, in so far as such prices were available.

Losses Allowed to Be Amortized

Decision in Valuation and Rate Case of Gas Company Contains Many Important Points

Losses amounting to $118,000 in the operation of the Nashville Gas & Heating Company since July 1, 1919, are permitted by the Tennessee Public Utilities Commission to be amortized over a period of ten years and a fair return under present conditions is fixed by the commission at not to exceed 7½ per cent and not less than 6½ per cent on the value of the property devoted to the public use. These are among some of the outstanding features of a decision rendered recently in a gas rate case of more than passing interest.

ANOTHER feature of the opinion is the attention directed by the commission to the fact that for every $1 that the consumer pays to the company for gas during 1921 the city of Nashville will get approximately 12 cents and the company 88 cents. The commission points out that this is a matter over which it has no control, but that so long as the city demands and collects these amounts as taxes the commission can under the law only allow them to be charged to operating expenses. This, of course, results in the payment being made indirectly by the consumer.

The rates for gas as fixed under the order are $1.90 gross per 1,000 cu.ft. and $1.80 net, the net rate to apply only to the patron who pays his bill within ten business days after the bill is rendered.

Experts made three estimates of the value of the property of the company. These were $2,508,665 as historical cost less depreciation, $3,569,990 as cost to reproduce new less depreciation based upon average prices for 1915-1919, and $4,655,380 as the cost to reproduce new less depreciation based upon present prices. The value as fixed by the commission is $2,650,000.

On this point the commission says that the public should not be made to bear the entire burden of the abnormally inflated present day prices of both labor and material as a rate of return upon a value reached alone by such method would be prohibitory. On the other hand, the company should not be made to bear the burden of too low a valuation based upon an estimate of its original cost less depreciation, as a return upon a value reached alone by such a method might prove confiscatory.

No dividends have been paid by the company since its reorganization in 1912; neither has the company earned interest on its bonded indebtedness of $2,000,000 since that date. Interest on the bonds for the period mentioned was $833,333 and net earnings for the period $722,862, making the deficit $110,471.

The company is directed to reinforce its service in the outlying residential districts so as to furnish an adequate and even flow of gas at all times, with its first available earnings over and above the 6½ per cent return per annum on the investment and the amount set out with which to amortize its losses since July 1, 1919, and is to pay no dividends until this work is finished.

The company is directed to establish and maintain a depreciation or renewal and replacement reserve, said reserve to be credited each month with 1/10 of 1 per cent of the value of the depreciable property of the company as of April 1, 1920, plus such amounts as have been or may be added and minus such amounts as have been or may be deducted after April 1, 1920.

Receiver in Denver

Ernest Stenger, Successor to Mr. Hild as Operating Head of Tramway, Named Under Court's Direction

On application of the Westinghouse Electric & Manufacturing Company made Dec. 24 Ernest Stenger, president, was appointed receiver for the Denver (Col.) Tramway by Judge Lewis of the Federal court. The application was premised on an overdue account of the Westinghouse Company for $13,577 incurred for materials and supplies furnished the tramway, which was unable to pay.

The application for the receiver sets out that the company has overdue and unpaid bond and note interest aggregating $346,800; deliquent and unpaid taxes in Denver County of approximately $95,000; unpaid and overdue accounts for materials and supplies in a sum in excess of $150,000, and in addition has no funds with which to meet taxes, approximately $300,000, payable in 1921; that the operating expenses, due largely to increases in wages of employees and costs of materials, during the year 1919 were more than 100 per cent greater than prior to the war and that wage increases alone were more than $1,000,000 a year greater than before the war, while the fare increase had been only 20 per cent, with the result that for the year 1920 the company's net earnings were less than half the fixed charges on the property.

As a result of these conditions the earnings for the year 1920 will be less than 3 per cent on the valuation of the property as found by the Public Utilities Commission of the State of Colorado and approved by a committee of fifty-five representative citizens of Denver. On account of the company's inability to obtain higher fares the continued operation of the properties as a unit and the rendition of proper service to the public is seriously threatened and crippled and the financial situation and conditions are such that the applicant company felt a receiver should be appointed so that the court may fully administer the property and funds of the company.

Receiver Stenger made no comments on his appointment or the future policies of the company other than to say that for the present there will be no material changes in either the personnel of the company or in the compensation and wages paid.

100,000,000 Passengers During 1920

One hundred million passengers will have been carried over the lines of the Pacific Electric Railway, Los Angeles, Cal., at the close of the year 1920, according to estimate given out by H. B. Titcomb, vice-president of the interurban company. This estimate, Mr. Titcomb states, is based on the actual volume of traffic that has been handled during the first ten months of the current year, and will constitute for the year 1920 the greatest volume of business handled in the history of the company. The highest previous mark was made in 1913. In that year 83,000,000 passengers were carried.

While reflective to a degree of the greatest increase that has been made in the population of Southern California, Mr. Titcomb points out that comparative figures of the past few years cannot be taken as a true index of increases in population. This, he explains, is due largely to the advent of the automobile, which has made heavy inroads on electric railway transportation.

The Pacific Electric, it is pointed out, up to and including the year 1913, showed a steady and consistent increase in volume of traffic handled. Beginning with the year 1914, however, the popularity of the automobile brought about a decrease in both urban and interurban railway traffic which continued until, for the year 1918, the volume carried over the interurban company's system had dropped to a total of 77,500,000 passengers.

Mr. Titcomb states that the figures of the current year are perhaps more truly indicative that the peak in automobile transportation has been reached. He is of the opinion that rising costs of automobiles and of gasoline have been so greatly out of proportion to such increases as have come about in electric railway fares that he is firmly of the belief that electric railways will have little hereafter to fear in obtaining their just proportion of the increased travel.

St. Paul Valuation Protested

Exception to the valuation of $11,000,000 placed on the property of the St. Paul (Minn.) City Railway and filed with the City Council by E. W. Bemis is taken by President Horace Lowry, of the Twin City Lines, of which the St. Paul line is a subsidiary. The company has been paying taxes on a valuation of $16,000,000. Mr. Lowry made a statement as follows:

> The Bemis report is apparently very carefully prepared, but from the company's standpoint we are unable to agree that the principles are fair which he has used in arriving at his figures. Our valuation of the property is pretty well expressed by the fact that for several years we have, without protest, paid taxes on a valuation in excess of $16,000,000. It is needless to say that if we figured the property to be worth less money we would have contested paying taxes on this valuation, even to the extent of going into the court.
>
> We have not at hand the full details of Dr. Bemis' report, which are promised at an early date, but as we interpret it the net result of this report is that the company is not at this time even earning the return on the low valuation of $11,000,000, which he has placed on the property, and that the company cannot be expected to make any extensions or undertake any reconstruction or paving until conditions are changed through a readjustment of the rate of fare.
>
> Dr. Bemis feels that a few more weeks should elapse in order to analyze the earnings and expenses under the present 6-cent fare and at that time proposes to re-open the entire question and states that at that time he will make a definite recommendation as to the rate of fare and return on the investment.
>
> At that time the entire question will be re-opened and our company will be prepared to present to the St. Paul City Council its valuation of the property. We believe we can establish a value materially in excess of that proposed by Dr. Bemis.

Financial News Notes

Sale of Real Estate Postponed.—Sale of the real estate of the New York (N. Y.) Railways under foreclosure of the first real estate and refunding mortgage, has been postponed until Feb. 2, 1921, to await action in the United States District Court.

Vermont Company to Increase Stock.—The Burlington Traction Company, Burlington, Vt., has voted to increase its capital stock from $200,000 to $400,000. The company has filed with the Secretary of State a certificate certifying that the additional will consist of 2,000 shares of a par value of $100 each.

Sale for Taxes Threatened.—Harvey P. Cole, collector of taxes for the town of Williamstown, has announced that property owned by the Berkshire Street Railway at Williamstown, Mass., will be offered for sale at public auction on Jan. 8, for the purpose of obtaining payment of taxes owed the town by the company. The amount is $1,216, covering a period of three years.

Change in Tax Basis Suggested.—One of the measures of relief under consideration by Congress for extension to the Washington Railway & Electric Company and other lines in the District of Columbia is the placing of a tax on the net earnings of the railways instead of on the gross earnings as at present. This, it is estimated, would relieve the Washington Railway & Electric Company of $300,000 in charges.

Equipment Notes for One Car.—The Department of Public Utilities of Massachusetts has authorized the receiver of the Brockton & Plymouth Street Railway, Plymouth, Mass., to issue thirty-six notes aggregating $6,360 for the purpose of purchasing a one-man car under a conditional sale contract, the notes to mature at monthly intervals and to be in addition to a cash payment already made in connection with the purchase.

Receiver in Raleigh.—J. R. Baggett, Wilmington, N. C., has been appointed temporary receiver of the Cumberland Railway & Power Company, Raleigh, N. C. After a meeting with the directors of the company Mr. Baggett issued a statement to the effect that with co-operation on the part of officers, directors and bondholders the outlook was good for placing the properties on a paying basis.

Plum Island Line to Be Abandoned.—Operation of the Plum Island division of the Massachusetts Northeastern Street Railway, Haverhill, Mass., will be suspended at once, it is announced, and the tracks taken up. The line connects Newburyport and the island and is the only means of communication for the large number of cottagers who spend the summer at the island. It has not paid expenses for some time.

A $1,500,000 Tax Levy Proposed.—A bill recently introduced in the City Council of Seattle, Wash., by Councilman Carroll, provides for an annual tax levy of not to exceed $1,500,000 to aid in the maintenance and operation of the Seattle Municipal Railway. It provides for submission of the question to the voters at the general election on March 8. The bill was referred to the committee of the whole.

Losing $2,000 a Day.—The United Traction Company, Albany, N. Y., is now operating at a loss of $2,000 a day, according to a recent statement by the company. The deficit for the eleven months ending Nov. 30 is more than $371,000, and the accumulated deficit to that date amounts to nearly $700,000. The company some time ago applied to the Public Service Commission for the Second District for authority to raise its fare from 7 cents to 10 cents.

Webster-Putnam Service to Stop.—The Webster-Dudley Chamber of Commerce has received a letter from the Worcester (Mass.) Consolidated Street Railway and the Connecticut Company stating that the lines between the towns of Webster and Putnam are not to be continued. Both companies claim that the present income on lines in the territory adjacent to Putnam is not producing enough revenue to pay wages of operation.

Local Lines at Findley Appraised at $206,493.—The city system of the Toledo, Bowling Green & Southern Traction Company at Findlay, Ohio, is worth $206,493, according to a report filed by appraisers of the State Public Utilities Commission. The appraisers report will be used in drafting a service-at-cost franchise to supplant the present franchise, under which the company claims it is losing money. An application to discontinue service is now pending before the utilities commission.

How One Municipal Line Makes a Showing.—Through the charging of inadequate fares on the so-called Civic Lines, the city of Toronto, Ont., has been responsible for annual deficits ranging from $78,000 to $146,000, Thomas Bradshaw, ex-finance commissioner of Toronto, told the Chartered Accountants' Students' Association of Ontario. These deficits have been charged up against the general tax rate. In addition, the city has failed to provide for depreciation or taxes on the property.

Mayor Approves Mr. Feustel's Retention.—Mayor Moore of Philadelphia, Pa., has signed a contract with Robert M. Feustel, for services in preparing and presenting before the Public Service Commission the city's case in the Philadelphia Rapid Transit Company valuation proceedings. Mr. Feustel was engaged by the Department of City Transit as the city's representative in checking up the inventory and valuation of the railway property. Reference to the appointment was made in the ELECTRIC RAILWAY JOURNAL for Oct. 9, page 738.

Bonds Extended with Increase in Interest.—The Department of Public Utilities of Massachusetts has approved the extension of maturity date for five years from Jan. 3, 1921, of the $115,000 twenty-year first mortgage 5 per cent gold coupon bonds assumed by the Worcester Consolidated Street Railway from the Worcester & Clinton Street Railway. The interest rate is increased to 7 per cent. The existing financial conditions prevented refunding by a new issue, and the increase in the interest rate is necessary to secure the consent of noteholders to the extension.

New Hampshire Town Votes to Buy Road.—The citizens of Hampton, N. H., have voted to purchase the Exeter, Hampton & Amesbury Street Railway, at a cost not to exceed $80,000, with the understanding that if the road failed to pay expenses the town of Exeter would make an annual contribution of $2,500 for a term of five years. The road connects Hampton with Exeter, Hampton Falls, Hampton Beach and Smithtown in N. H., and Amesbury, Mass., operation being over about 20 miles of track. It was built in 1897.

Unscrambling Impossible.—State Public Utilities Commissioner Joseph W. Alsop, in an address at Hartford on Dec. 20, said that the "unscrambling of the Connecticut Company is impossible under the trusteeship plan." He said that the company did an entirely intrastate business, but was virtually not under the control of the State because of its management by federal trustees. He stated $40,000,000 in stock certificates was represented in the Connecticut Company and it would be impossible under the trusteeship for the trustees to sell the road.

Hyde Park Bill Passed by House.—The Massachusetts House has passed to be engrossed a bill authorizing the Boston Elevated Railway to begin operation at once on the Eastern Massachusetts Street Railway lines in Hyde Park. The bill provides a payment of $30,000 by the city of Boston to the Boston Elevated Railway in order that tracks approaching Hyde Park Avenue may be put in satisfactory condition, and the city also guarantees to make up any deficit in operating expenses on the new line. The city has been ready to pay this money for months, but was unable to do so because of irregularities in a bill passed in the regular session. These irregularities are corrected in the new bill.

Decrease Reported in Spokane in November.—Despite the fact that 72,044 more passengers were carried by the Washington Water Power Company on its city lines in Spokane, Wash., in November, 1920, than in the same month of 1919, the net revenue declined practically $5,000 according to the report made to Mayor Fleming. The gross receipts increased from $55,886 to $90,531 while operating expenses increased from $55,156 to $62,147. The income with the operation charges deducted was $28,383 last month as against $31,729 in the same month last year. Taxes and replacement reserve last month were $21,272 as compared with $19,724. The net earnings last month were $7,111 and in November, 1919, $12,005.

Standard Traction Absorbed.—The Dallas (Tex.) Railway effective on Dec. 1, took over the Standard Traction Company, which had been operating in the Mount Auburn and Parkview additions to the city, connecting with the lines of the Dallas Railway, to which transfers were issued. Under the new arrangement through service will be operated from the business district on both lines with new one-man cars. Twelve of the new cars will be used and a 7½ minute schedule will be maintained. The Standard Traction Company agreed to turn over to the Dallas Railway its property and bonus of $30,000 cash offered for the construction of a line to the two additions via Lindsley Avenue. The Dallas Railway has accepted this offer contingent on the city granting a new franchise. The proposed line would cost about $100,000.

Rental Case to Be Appealed.—Berne H. Evans, counsel for the Public Service Commission of Pennsylvania has announced that the commission would join with the city and business associations in an appeal to the Supreme Court from the decision rendered by the Superior Court in the case of the rentals of the underlying companies included in the system of the Philadelphia Rapid Transit Company. The Superior Court set aside an order of the Public Service Commission which required the underlying companies to reply to the complaint that the rentals they received from the Philadelphia Rapid Transit Company were "excessive and unjust." The Public Service Commission, it was announced, will defend the right of the commission to regulate rentals that have a direct bearing on the rate of fare exacted from the public by the Philadelphia Rapid Transit Company.

Court to Fix Priority of Liens.—In the United States court at Savannah Judge Beverly D. Evans heard the intervention of the city of Brunswick, Ga., in the case of the Columbia Trust Company vs. the City & Suburban Railway, under which the railway at Brunswick was placed in the hands of a receiver about a year ago. The intervention was for the purpose of having the railway's pro rata part of paving costs on streets occupied by its tracks declared a lien on its property. After a short hearing on the intervention Judge Evans announced that he would take the matter under advisement and render his decision later. There was a general discussion of the affairs of the railway, which has been operated at a loss. Various suggestions were made to solve the question so that there might be no necessity for scrapping the system.

Traffic and Transportation

Autos Killed 7,969

Deaths Resulting from Automobile Accidents in Territory Registered by Census Shows Increase

A total of 3,808 persons were killed in automobile accidents or died as a result of such accidents in sixty-six of the larger cities of the country in 1919, according to a compilation recently made public by the Bureau of the Census, Department of Commerce, Washington, D. C. The total number of deaths resulting from automobile accidents throughout the territory registered by the Census Bureau, representing about 80 per cent of the population of the United States, was 7,969. The rate per 100,000 of population in the registration area has not been determined, but the rate for the sixty-six cities is placed at 14.1.

ALARMING INCREASE SHOWN

The Census Bureau's statement points out that this death rate of 14.1 for the cities represents an increase over that for every year since 1915, when the rate was 8.0 per 100,000, and an increase of 245 in the total number of deaths over 1918. It declares that the number of persons killed each year in automobile accidents has reached alarming proportions, and urges that prompt measures be taken to protect pedestrians from reckless motorists. The following suggestions are made for reducing the number of accidents:

1. At street crossings the erection of curbed safety islands, which, at the most dangerous spots, should be very close together.
2. Construction of additional crossings in the middle of blocks, where automobiles can approach from only two directions.
3. Demonstration of great skill in driving each machine before granting a driver's license for that machine.
4. Reduction of the speed limit, especially at crossings.
5. Fine, revoking of license, and imprisonment, each to have its place as an actual penalty.

Referring to the increase in the number of fatalities, the bureau's statement says:

> Each year the death rates from automobile accidents are higher than the rates of the previous year. Each year it becomes more and more dangerous for a person to walk the streets. The reason usually given, and probably the correct one, is that the number of automobiles in use is constantly increasing. How then shall this ever increasing danger be lessened? The obvious remedy is to improve constantly the traffic regulations to keep pace with the ever increasing number of automobiles.
>
> STRICTER REGULATION NEEDED
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> This call for better and better traffic regulations is not a fanciful one. Everyone is familiar with the necessity for slow and orderly progress when a crowd emerges from a circus tent and, similarly, automobile traffic must be slowed down and controlled until it becomes safe.
>
> The 1919 rates for Kansas City, Mo., San Antonio and Cleveland—all much lower than for 1918—furnish a ray of hope that we are finally waking up.
>
> The tendency of some writers to exonerate automobile drivers and to place the blame of accidents upon pedestrians indicates lack of a full comprehension of the problems involved.
>
> The teaching of caution is admirable and in time pedestrians will undoubtedly become more and more careful, but there will always be on our streets the person who misjudged the speed of an approaching automobile and becoming confused knows not which way to go; there will always be the child who has not yet acquired the ultra-cautious habit, and there will always be old people who cannot hear and see so well as they used to and who are not so keen and active as they once were. The preaching of more caution to these people will never be sufficient. They must be protected by additional safeguards, and city governments which will continue to make their traffic regulations more and more rigid till they can point to low death rates from automobile accidents will deserve the commendation of all thoughtful people.

YOUNGSTOWN'S RATE 28.5 PER 100,000

Youngstown, Ohio, heads the list of sixty-six cities in the automobile death rate with 28.5 per 100,000, but shows a decrease from the previous year, when the rate was 31.9. Richmond, Va., had the lowest rate with 5.9, but showed a slight increase over 1918, when it was 5.4. New York had the largest total number of deaths with 780, an increase of 89 over the previous year and more than double the number in 1915. New York's automobile death rate was 14 per 100,000 persons. Chicago's total deaths numbered 328, an increase of 37, with a death rate of 12.3.

Statistics compiled by the bureau for other cities of 250,000 or more population follow:

Philadelphia total 191, decrease 35, rate 10.6; Detroit 139, increase 14, rate 14.4; Cleveland 126, decrease 42, rate 16.0; St. Louis 105, increase 12, rate 13.7; Boston 125, increase 17, rate 16.8; Baltimore 106, increase 4, rate 14.6; Pittsburgh 94, decrease 11, rate 16.1; Los Angeles 119, increase 28, rate 21.1; San Francisco 85, increase 11, rate 16.9; Buffalo 68, decrease 22, rate 13.6; Milwaukee 60, increase 12, rate 13.2; Washington 58, increase 4, rate 13.4; Newark 82, increase 20, rate 20.0; Cincinnati 67, increase 8, rate 16.7; New Orleans 36, increase 8, rate 9.4; Minneapolis 38, decrease 5, rate 10.1; Kansas City, Mo., 42, decrease 22, rate 13.1; Seattle 50, increase 10, rate 16.0; Indianapolis 26, decrease 1, rate 8.4; Jersey City 40, increase 10, rate 13.5; Rochester 32, increase 7, rate 10.9; Portland, Ore., 31, no change, rate 12.1; Denver 41, decrease 2, rate 16.1.

Five Cents a Mile

The Public Service Commission for the Second District has authorized the Southern New York Power & Railway Corporation, Cooperstown, N. Y., to file a new passenger tariff, effective on five days' notice, establishing cash, ticket and mileage fares at rates not exceeding 5 cents a mile for travel between Mohawk and Oneonta, excepting in Oneonta. If the company discontinues the sale of mileage books now in use or increases the mileage rate, outstanding mileage books will be redeemed if presented for redemption before the expiration of the book. The increase authorized is for one year or until another order by the commission makes the rate inoperative.

Seattle Increase Soon

Municipal Railway Will Raise Token Rates on Jan. 8—One Councilman Proposes Free Rides

Token fares on the lines of the Seattle (Wash.) Municipal Railway will be increased from 6¼ cents to 8⅓ cents on Jan. 8 by the terms of an ordinance recently passed by the City Council. The new rates provide a cash fare of 10 cents as at present; token fares, 8⅓ cents or three for 25 cents, six for 50 cents and twelve for $1. Fares for school children remain at the present rate: single cash fare, 3 cents; cash fare for two children, 5 cents; school tickets, ten for 25 cents, or 2½ cents each. Former service men under jurisdiction of the Federal Board for Vocational Training will pay the same rates as school children.

Passengers who pay cash, tokens, or school-ticket fares will be entitled to transfer privileges, except that transfers will be issued to the Seattle & Ranier Valley Railway only upon payment of the cash fare of 10 cents. An additional fare will be charged on the Highland Park and Lake Burien line operated by the city for transportation to points outside the city limits, according to D. W. Henderson, superintendent of the municipal railway system.

Mr. Henderson estimates that the increased fares will bring the municipal system to a point where there will be a surplus of $230,000 at the end of 1921. The estimate is based on the assumption that the average number of passengers a month in 1921 under the increased fare will be 7,366,634, the average number which rode on the car lines in August, September and October of this year.

FREE RIDES SUGGESTED

A proposal will shortly be submitted to the City Council by Councilman Oliver T. Erickson, chairman of the judiciary committee, providing for the establishment of a 2½-cent or 3-cent fare on the Seattle Municipal Railway and for the eventual doing away with fares entirely. Mr. Erickson has asked the Corporation Counsel to prepare an amendment to the city charter to put his plan in operation.

Mr. Erickson says the fare would include not more than 1½ cents to be set aside in an extension and depreciation reserve fund for extensions and track and equipment purposes, to be expended by the Council. All other costs of operation and maintenance would be paid from the general fund, increasing the general tax levy about 2 per cent. With the retirement of all outstanding bonds and debts, the collection of this fare would be discontinued, and all costs of construction, operating and maintenance paid from the general fund. Mr. Erickson has long been interested in municipal ownership of the traction system. He believes that the time is approaching when the payment of fares on municipal transportation systems must go the way of tolls on roads and bridges.

One Cent for Transfers in Indianapolis

Commission Grants Railway an Additional Charge for Trial Period—Company Looks for $150,000 Increase in Revenue

The Indianapolis (Ind.) Street Railway on Dec. 20 began charging 1 cent for each transfer, in accordance with an order of the State Public Service Commission issued on Dec. 18. The 1-cent transfer charge was authorized by the commission for a trial period of seventy-one days. In its order the commission intimated that, if the results of operation under the new plan proved unsatisfactory, further relief would be forthcoming. The basic nickel fare was retained as being in the best interest of the community. The company had applied for a 2-cent transfer charge and for an increase in the amounts paid it for the use of the city tracks and for terminal facilities by the interurbans entering Indianapolis. Hearings on the original and supplementary petitions were held by the commission, as reported in the issue for Dec. 18, page 1262. It is estimated by the commission that the 1-cent transfer charge will add $182,000 a year to the revenues of the company. The company's estimate is approximately $150,000.

In granting the 1-cent charge the commission stated that it sought the most equitable method of relieving the company. With reference to its policy toward the city and the railway, it said:

> The company, from the standpoint of its financial organization and fixed charges, is on a safe and sound basis. For more than two years the company has been very closely regulated by this commission. Methods of operation have been changed at the direction of the commission. Economies and efficiencies have been effected and adopted. Under orders of this commission, great improvement in service has been made. New equipment has been added, and the service of the company greatly improved. Needed extensions of lines have been made at the request of this commission. For more than two years this company has made every effort to conform to its obligations as an agency of public service. * * * The citizens of Indianapolis, by the economies and management of the company, have been saved millions of dollars in street car fares as compared to the citizens of the large number of other similar sized cities in the United States.
>
> ### Commission Backs Railway
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> In view of all this the commission desires to emphasize the fact that during the period of its jurisdiction it intends to stand behind this company to the full extent of the commission's power to maintain the solvency and credit of the company and to protect its property and interests, provided that the company continues to exercise its best efforts to meet the legitimate demands of the public.
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> The commission also finds it desirable to state to the city that its legitimate needs may be taken care of. The commission will recognize, and in revenues provide for, current market rates for money so demanded for public use. * * *
>
> The responsibility having been placed on the commission by mandate, the commission may not sit idly by if unwarranted demands are made either in the matter of extensions and improvements or rates for money. * * *

The commission states that it has accepted for its guidance for emergency purposes, "the broad latitude or value between $14,000,000 and $16,000,000." In submitting, in 1920, a service-at-cost proposal, the city of Indianapolis offered to agree, for such purposes, to a value of $15,000,000. On a 7 per cent basis, $15,000,000 valuation would have called for fixed charges of $1,050,000, as compared with $989,380. In its proposal for service at cost the city included as a part of the cost of service a return on the value of the property put to public use. The commission, therefore considers itself "amply assured that no unfair burden is placed on the public served if recognized as valid and justified the listed $989,360 of fixed charges for 1921."

After reviewing the results obtained by the railway under the basic nickel fare, the commission continues:

> Having accomplished these remarkable results, it is not wisdom for the utility, city, or the commission to depart from such policies. It may be that a 2-cent transfer, or even a higher basic fare will be proven to be necessary, but the commission is of the opinion that, especially under this interlocutory order, the possibilities of the 1-cent transfer should be ascertained in a brief experimental period extending through January and February. It is possible that new conditions affecting both operating costs and revenues may be more clearly discerned and understood early in the year 1921.

The commission, in the order issued on Dec. 18, does not pass on the supplementary petition which raised the question as to whether the interurban companies are paying enough to the local company for power, track rental and terminal facilities. It found this question too complicated and the evidence too incomplete to pass upon at this time. It is intimated that a technical investigation may be ordered by the commission. The commission found that the local freight terminal facilities were inadequate, and has ordered the Indianapolis Street Railway to submit on or before Feb. 1, next, plans for improvements to be carried out by itself or the interurban companies.

Another Vote on Duluth Fare

By a vote of three to two the Council of Duluth, Minn., on Dec. 24 adopted a resolution authorizing a special election to be held on Feb. 3, when the citizens will again vote on an ordinance to grant the Duluth Street Railway a 6-cent fare. The proposed ordinance provides that it will be inoperative after two years from its adoption by the people, and may be terminated after one year. In brief, it provides for a 6-cent fare, for continuation of the present wage schedule of the railway's employees, for an improved service schedule and for the company to make such street improvements, as are in the opinion of the City Council found necessary.

The City Council also adopted a resolution placing the entire burden of the election and its incidental expenses upon the company and requiring the latter to deposit a check for $4,000 with the City Treasurer before Dec. 30 as a guarantee. The expenses of the election were estimated at $3,500.

The Council recently decided to force the railway to improve its service under sections nine and eleven of its franchise, which provide the city with power to regulate operation and management of the lines and to prescribe the number of cars which shall operate over any line. City Attorney John E. Samuelson had previously advised the Council that the company's complaint that it could give no better service on a 5-cent fare was not a valid excuse and that the company should fulfill its contract.

Railway Should Operate Buses, Says Connecticut Official

Operation by the Connecticut Company, of buses to supplement its trolley service was advocated by Lieutenant-Governor Clifford B. Wilson of Connecticut in an address at a recent meeting of the Get-Together Club of Hartford. The Lieutenant Governor, who is also Mayor of Bridgeport, declared that in time motor buses might replace the present electric railway system, but that, since the transportation business is monopolistic by nature, development of the bus idea should be undertaken by the railway.

It was pointed out at the meeting that the incoming Legislature would be called upon to abolish the state tax on gross receipts, paving taxes and the bridge taxes. Harrison B. Freeman, receiver of the Hartford & Springfield Street Railway, stated that a 10-cent fare was "about the limit" and that it was inadvisable to raise the rate above that point.

Public Utilities Commissioner Joseph W. Alsop told the gathering that the Connecticut Company's system cannot be split up as long as the company is in control of trustees appointed by a Federal court. In pointing out the status of the company, Commissioner Alsop said that the company did an entirely intra-state business but was virtually not under the control of the state because of its management by the trustees.

Lieutenant Governor Wilson summed up his remedies for the state's transportation situation as follows:

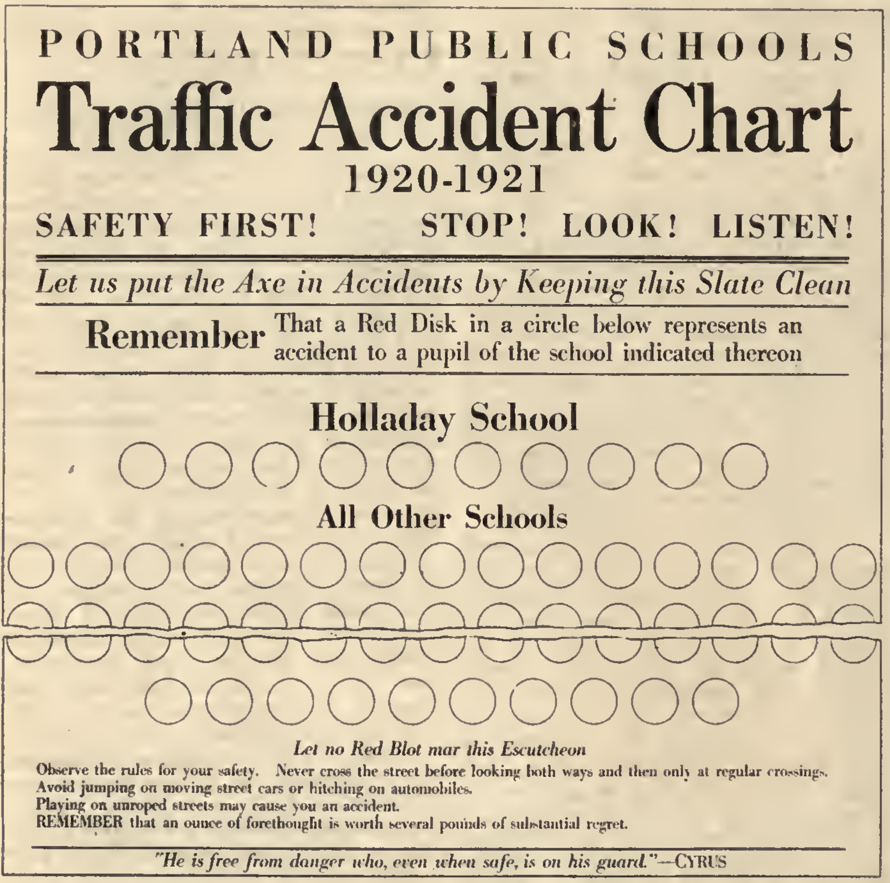
1. Retain the corporate entity of the trolley company.
2. Keep your transportation system monopolistic, but with proper regulation and control.
3. Permit the trolley company to operate motor buses.
4. Let the period of transition from the trolley to the motor bus be gradual as it is inevitable.
5. Let the experience of each community work out the destiny of its transportation system.
6. Do not operate as an entity for the whole state.
7. Let suburban lines be actually what they were intended to be, namely, competitors of steam roads, placing them on a mileage basis if necessary.
8. Readjust the system of state taxation and permit the towns to assess along with other property an equal proportion of the burdens of the town in which the physical properties of the company are located.

Safety Preached in Schools

The public school safety campaign is again on in Portland, Ore., under the direction of the National Safety Council. Co-operating in this work is the Portland Railway, Light & Power Company, which has heartily approved of the methods and plans of Portland's public schools in the campaign for the conservation of human life.

Much has been said regarding the efficient manner in which the pupils have been instructed in "safety first" during the past ten years in that city, but a departure was instituted this year by putting into each school a traffic-accident chart illustrated in the accompanying engraving. This chart is presented to the school by the "prominent" citizen giving the lecture on safety with the admonition to the pupils to "keep the slate clean."

The chart is provided with circles in which red discs will be placed whenever there is an accident to a school child. These red discs are the size of the circles and will be printed with the name of the school to which the unfortunate pupil belonged and the date of the accident. The discs will be sent out from the office of the superintendent of schools with instructions to paste them on the chart. The school whose name appears on the disc will attach it in the circles reserved for that school, otherwise it would be pasted below. Information of a safety nature appears in the chart.



PORTLAND PUBLIC SCHOOLS

Traffic Accident Chart

1920-1921

SAFETY FIRST! STOP! LOOK! LISTEN!

Let us put the Axe in Accidents by Keeping this Slate Clean

Remember That a Red Disk in a circle below represents an accident to a pupil of the school indicated thereon

Holladay School

All Other Schools

Let no Red Blot mar this Escutcheon

Observe the rules for your safety. Never cross the street before looking both ways and then only at regular crossings.
Avoid jumping on moving street cars or hitching on automobiles.
Playing on unroped streets may cause you an accident.
REMEMBER that an ounce of forethought is worth several pounds of substantial regret.

"He is free from danger who, even when safe, is on his guard."—CYRUS

TRAFFIC-ACCIDENT CHART FOR USE IN PUBLIC SCHOOLS

Much interest is manifested by principals and pupils to "keep the slate clean" and the psychological effect upon the child, as he examines the chart daily, is a constant reminder to him.

This chart was produced under the direction of Harry P. Coffin, manager of the public safety section of the National Safety Council, Oregon Division.

Seven Cents in Birmingham

Acting on the petition of Lee C. Bradley, receiver of the Birmingham Railway, Light & Power Company, Birmingham, Ala., the State Public Service Commission on Dec. 22 authorized an increase in fare to 7 cents on the Birmingham lines beginning Jan. 1.

The increase in fares was vigorously resisted by the City Commission. J. Ellis Brown, Commissioner of Public Utilities of the city of Birmingham, stated, following the announcement of the decision, that the city will ask for a reduction of fare to 6 cents.

Under the terms of the commission's order the 7-cent fare was granted for a period of one year. The petition of the receiver asked for the increase as an emergency measure. He showed at a hearing before the Public Service Commission on Dec. 21, that the company had been largely increased under the receivership.

The city of Birmingham maintained that the company was not entitled to the increase as a matter of "right." It showed that the receiver had "inherited" a number of debts when he took over the property, and maintained that while he had largely increased the indebtedness, the money expended had been used for capital investments. The city maintained that the 6-cent fare, which has been in effect for about a year, would give a proper return on the investment and claimed that the debts for what the city claimed were capital investments, should be paid by the owners of the property.

Immediately following the announcement of the decision granting the company the right to charge a 7-cent fare; J. S. Pevear, general manager of the company, stated that everything was in readiness to put the increased rate in effect. The only formality necessary was an order of Judge W. I. Grubb.

Estimates by city officials place the aded revenue, which will result from the increase, at $300,000 per year.

Interurban Decision Deferred

In awarding the 1-cent transfer charge to the Indianapolis Street Railway, the Public Service Commission of Indiana has authorized the Union Traction Company of Indiana to increase the fare between Indianapolis and Broadripple from 5 to 10 cents. Fares for rides between the down-town district and Forty-sixth Street, which is over the tracks owned by the Indianapolis Street Railway, will remain at 5 cents, and from Forty-sixth Street to Broadripple (over tracks owned by the Union Traction Company) the fare will also remain at 5 cents. Tickets will be sold at six for 50 cents. This order is effective Jan. 1. Petitions of the interurban companies for increased fares within the city were continued by the commission to provide time for readjustment of contract relations with the city.

The commission finds that the practice of the interurban companies in charging a city fare of 5 cents while at the same time interurban passengers are charged a fare of 3 cents a mile in the case of regular passengers and 1.78 cents a mile in the case of commuters, is discriminatory in favor of the city passenger. The commission also holds that the evidence does not disclose any essential difference in transportation over mileage within and without the city which could be expected to be reflected in the rate, and that therefore the discrimination cannot be removed by reducing the interurban fare within the city.

The commission states that the 5-cent fare has been charged because of a franchise agreement with the city of Indianapolis which is still in force. Because of the fact that the interurban companies have not surrendered their franchises as provided by law the commission holds that its jurisdiction is debatable. Therefore the commission believes that these interurban companies should go to the city officials and endeavor to have the provisions of their franchise changed so as to permit of the charging of a higher fare.

Transportation News Notes

Parents Asked to Warn Children.—The Duluth (Minn.) Street Railway is conducting an advertising campaign in the local newspapers to educate the public against coasting accidents. The ads call attention to the fact that coasting accidents have already occurred and that narrow escapes are reported daily. Parents are asked to warn their children against coasting across car tracks.

Wants More in Ithaca.—The Ithaca (N. Y.) Traction Company has applied to the Public Service Commission, Second District, for authority to charge a fare of 10 cents in all municipalities in which it operates, effective on short notice. The company submits statements and alleges that the present 7-cent fare is insufficient to yield reasonable compensation for the service rendered.

Must Charge 5 Cents.—Judge J. B. Hutcheson has denied a motion of counsel for the Georgia Railway & Power Company, Atlanta, Ga., for a writ of supersedeas to allow the company to raise its fare from 5 cents to 7 cents on its line in Decatur. Some time ago Judge Hutcheson enjoined the company from charging a 7-cent fare and giving passengers 2-cent rebate receipts, as is being done in College Park under the terms of a supersedeas issued by Judge Pendleton.

Central Association Reissues Tariffs.—The Central Electric Traffic Association is reissuing theatrical baggage tariffs with additional rules and change of rates. Joint passenger tariffs in Indiana are also being reissued to conform to change in rates, later to be followed by reissuance of passenger tariffs in Ohio; and after the reissuance of these tariffs, the interstate passenger tariffs will be reissued to conform to recent rate raises which have been general all over the country. It is planned to reissue the Central Electric Railway equipment register early in 1921. Joint local storage tariffs will shortly be reissued also.

Ten Cents in Vancouver.—The Washington Public Service Commission has authorized the North Coast Power Company, Vancouver, to put into effect a 10-cent fare on its Vancouver city lines with commutation books of eleven tickets for $1. The fare has been 7 cents. In promulgating the order the commission took occasion to review the general situation with respect to street railway companies, pointing out that companies everywhere are in a bad way financially, "due principally to the competition of automobiles, both private and for hire, and the only method by which the companies can secure a sufficient return to justify their continued existence is through increased fares."

Delays Final Action on Parking.—The new traffic ordinance for Chicago, Ill., in which it was proposed wholly to prohibit all parking of vehicles on any of the streets in the "Loop" district between the hours of 7 a.m. and 6:30 p.m., has been tabled. The bill was recently passed by the City Council. Later Mayor Thompson referred it back to the Council and asked for its reconsideration. The Council referred it back to the committee on local transportation, where it originated. This is considered to have virtually killed the bill. Pending final settlement of the parking problem the present ordinance which limits parking to a 30-minute period will be enforced by the chief of police. At the end of the month he will report to the committee on the advisability of re-passing the proposed no-parking ordinance.

Service Restored Pending Fare Decision.—Normal street car service has been re-established in the cities of Syracuse and Utica by the New York State Railways. Mayor Harry H. Farmer of Syracuse and Mayor James K. O'Connor of Utica made application to the Public Service Commission, Second District, for a restoration of service, which was granted in each case. The company resumed old schedules and took back all of the men recently relieved from duty, pending action by the commission on the application for a 10-cent fare in both Syracuse and Utica. The company is charging 6 cents in both cities. It claims this rate to be inadequate. The service was curtailed because of the refusal of the municipalities to allow the railway to increase the rate. The Common Council of Syracuse recently rejected a plan for the drafting of a service-at-cost ordinance for the Syracuse lines.

Eight Cents in Auburn.—The Public Service Commission, Second District, has authorized the Auburn & Syracuse Electric Railroad, Auburn, N. Y., to charge until Dec. 31, 1921, an 8-cent fare in Auburn, a 10-cent fare between Auburn and the Soule Cemetery, and between Auburn and the South Street on its Owasco Lake line, with transfer privileges; and outside of the city limits on the Soule Cemetery, South Street or Owasco Lake lines, 5 cents. The increase asked for was based chiefly on increased wages. Employees demanded an increase last spring. A four days' strike followed. An arbitration award gave a 15-cent an hour increase to conductors and motormen, and increases ranging from 18 to 23 per cent to other employees, thereby adding about $90,000 to the operating expenses of the company and $60,000 to the operating expenses of the city system. The Auburn city authorities waived a franchise restriction until Dec. 21, 1921.

Passing Stalled Car Legal.—The ordinance of the city of Raleigh, N. C., regulating traffic passing stationary street cars does not affect a car standing still in the middle of the block or at places other than those designated for the receiving or discharging of passengers, according to a recent ruling of Municipal Judge Harris. Judge Harris held that an automobile or any other vehicle may pass a stationary car in the middle of a block without an infraction of the law. The ruling came in the midst of the trial of a motorist charged with reckless and careless driving in colliding with a motorman. The evidence showed that the street car was stationary in the middle of a block just behind a work car. The defendant drove his machine to a point opposite the electric car and struck the motorman shortly before his automobile stopped. The defendant contended that the motorman stepped in the way and that the accident was due to the motorman's carelessness.

Seven-Cent Fare Approved.—Judge J. C. Hutcheson of the United States District Court for the Southern District of Texas has approved the report and findings of the master in chancery in the case of the Galveston (Texas) Electric Company versus the city of Galveston, in which the traction company sought authority to increase its fare from 5 cents to 7 cents. The company contended the 5-cent rate was confiscatory. Judge Henry J. Dannenbaum was appointed special master and held hearings and conducted thorough investigations in Galveston to determine the property valuation, rate of return, fair depreciation, maintenance costs and other factors to be considered in fixing a fair rate of return. The master in his report recommended the granting of a 7-cent fare for the Galveston lines. The court has enjoined the city authorities from interfering with the collection of the higher rate. The company will shortly begin negotiations with the city looking to the drawing up of a new franchise.

Dairymen Want System Improved.—Every electric and steam railroad in the state of Ohio is a defendant in the complaint brought by the Ohio Dairy Products Association before the Public Utilities Commission on Dec. 16. The association asks that the roads be compelled to adopt a uniform receipt or waybill system in the transportation of milk cans. The particular item of complaint has to do with the "ticket system" in use by the roads for identifying the cans. It is declared that the stubs of the tickets on the empty cans to be returned are frequently lost or washed off, resulting in loss of the can. In many other instances it is complained, all tickets on a shipment are tied to a single can, causing confusion, so that no record can be kept or had of any shipment. In consequence no proof of claim can be made showing either delivery to the carrier by the shipper or failure to receive shipment by the consignee. It is asked that the carriers issue a uniform receipt or waybill which will enable identification of cans and sureness of shipment and distribution.

Personal Mention

Resumes Law Practice

O. B. Willcox Will Have Office in New York—Resigns from Bonbright & Company

O. B. Willcox retires as vice-president of Bonbright & Company, Inc., New York, N. Y., on Jan. 1 to resume the general practice of law, in which he was previously engaged. He will have offices in connection with Messrs. Choate, Larocque & Mitchell, at 40 Wall Street, New York. It is understood, however, that Mr. Willcox will still represent Bonbright & Company in many matters.

Mr. Willcox has been closely identified with the electric railway industry in many ways during the past few years, not only through his connection as director of a number of utility, industrial and financial companies, but also as a member and a vice-chairman of the Committee of One Hundred of the American Electric Railway Association since the organization of that committee in June, 1919.

He is also a member of the board of governors of the Investment Bankers Association of America and for several years past has been the chairman of its committee on public service securities. In these capacities and through his reports, addresses and articles in the financial and technical papers on public utility topics, he has done a great deal to develop a proper understanding of the function of the regulation of utilities and in bringing about co-operation between investment bankers, public utilities and regulating officials.

Mr. Willcox is a graduate of the law department of the University of Michigan and practiced law in Detroit and later in Colorado with notable success. He came to New York about ten years ago, and since that time has been an active executive of Bonbright & Company, Inc.

Promotion for Mr. Krombach

Harry J. Krombach, who has been foreman of the electrical repair department of the Third Avenue Railway, New York City, for the past twelve years, has been advanced to the position of general foreman of shops for that company.

Mr. Krombach began his railroad experience in 1896 with the Nassau Electric Railroad, a subsidiary of the Brooklyn Rapid Transit Company, and worked in the shops of that company until 1900. He then entered the employ of the Boston Elevated Railway at the time it was equipping its first cars for electric train operation. In 1902 Mr. Krombach began service with the Manhattan Elevated Railroad, New York. Two years later he joined the Jersey Central Traction Company, Keyport, N. J. After serving with that road in various capacities for four years, he became connected with the Third Avenue Railway. For several years he has been in charge of all electrical repair work.

"Johnny" Livers Again

This Time Mr. Livers Becomes President of the Charlottesville & Albemarle Railway

John L. Livers, who has been vice-president and general manager of the Charlottesville & Albemarle Railway, Charlottesville, Va., since 1912, has been elected president of the company to succeed Norman James, who has resigned to become chairman of the board of directors. Henry L. Duer has been made vice-president of the company. Custis L. Carter, general superintendent, has been promoted to general manager, while Kirby Snider, manager of the new business department, has been made general superintendent.

"JOHNNY" LIVERS

Patrons of the Charlottesville line as well as the stockholders of the company agree that Mr. Livers' promotion has been well earned. Charlottesville, from the portliest "Colonel" to the tiniest picaninny, welcomes the opportunity to congratulate him. For the past eight years it has been congratulating itself on Mr. Livers' presence in its midst.

"Johnny" Livers has put Charlottesville, a city of 7,000 souls, on the map by giving it a real railway. Just how "real" this railway is from the viewpoint of the car riders may be judged from the fact that it operates the year 'round at a five-minute headway and a nickel fare. As for the stockholders, their opinion of their "G. M." is not hard to guess when one is told that during the past year the railway has paid dividends of 7 per cent on its preferred and of 3 per cent on its common stock, besides setting aside a considerable amount for depreciation reserve and surplus.

"Johnny" Livers was born in Gettysburg, Pa., in 1878. Starting as a lineman at the age of eighteen he worked for several years in various phases of construction work. He then entered the operating and contracting field, and during a period of twelve years constructed more than 100 electric light and power plants. In 1912 he took charge of the Charlottesville property. An account of Mr. Livers' operating methods was published in the issue of Sept. 22, 1917, page 485.

Changes in Interurban Personnel

Harry E. Pence, president of the Pence Automobile Company, has been elected president of the Minneapolis, Northfield & Southern Railway, Minneapolis, Minn. Former President J. H. Ellison is chairman of the board. W. R. Stephens, formerly of the "Omaha" road and of late sales manager for the Pence Company, is assistant to the president. Mr. Pence is president of the Minneapolis Automobile Trade Association, is a director in the Lincoln National Bank, is member of a company erecting office buildings, and is a progressive citizen generally.

New equipment has been bought for the Minneapolis, Northfield & Southern Railway and eventually the line will be electrified. It is now gaso-electric and has steam engines for switch work.

H. R. Skirving in New York

H. R. Skirving has been appointed auditor of the Eighth Avenue Railroad, New York City. Mr. Skirving served as auditor of the London & Lake Erie Railway, London, Ont., from 1906 to 1912. He then joined the Otsego & Herkimer Railroad, Cooperstown, N. Y., as auditor. The Otsego & Herkimer Railroad changed its name in 1916 to the Southern New York Power & Railway Corporation, and in the following year acquired the Southern New York Power Company, a merger of several small lighting properties in that section of the State. Mr. Skirving served as treasurer of both companies until Dec. 15 last.

G. T. Seely, President

Garrett T. Seely, vice-president and general manager of the Pennsylvania-Ohio Electric Company, has been elected president of The Youngstown Municipal Railway, a subsidiary of the Pennsylvania-Ohio Electric Company, which operates the city railway lines of Youngstown, Ohio, under a service-at-cost arrangement. Mr. Seely succeeds as president of the Youngstown company R. P. Stevens, who resigned as president to be able to devote more time to his duties as president of the Pennsylvania-Ohio Electric Company and associate companies. Mr. Stevens remains a director of the Youngstown Municipal Railway.

Promotions on Public Service Railway

H. H. George Appointed Engineer Maintenance of Way—H. W. Codding Made Distribution Engineer—Others Step Up

A number of promotions of interest have recently taken place in the engineering department of the Public Service Railway of New Jersey. Under the new plan Howard H. George, assistant engineer, becomes engineer maintenance of way. Martin White continues as superintendent maintenance of way. H. W. Codding, engineer of the distribution department, is advanced to distribution engineer. George H. Haldeman is promoted to assistant engineer maintenance of way, while Nelson A. Baldwin is made special work engineer. Morris J. Baller becomes estimating enginer, while Leslie B. Woodruff is appointed construction engineer. B. W. Pierson, formerly secretary to Richard E. Danforth, vice-president and general manager, is made executive assistant to Mr. Danforth. Alfred H. Nelson is promoted to chief clerk in the engineering department.

HOWARD H. GEORGE, appointed engineer maintenance of way, is a graduate in civil engineering of the University of Pennsylvania, class of 1907. He began his practical experience early in the summer of 1906 as resident engineer in charge of the construction of a suburban railway extension for the Public Service Corporation, and remained in charge of that work during his last year at college. Upon the completion of the project in 1907, he was transferred to headquarters at Newark, where he served as a field engineer until 1909. At that time he was appointed division engineer of the Southern Division of the company's property, taking in all the lines radiating from Camden. In 1911 he was promoted to the position of assistant engineer and again transferred to Newark. He served in this capacity until May, 1917, during which time he was in charge of estimating and engineering cost accounting work, and also had supervision over bridge design and erection.

As an officer of the Engineer Officers' Reserve Corps, Mr. George, then a first lieutenant, was called to active duty on May 8, 1917. After three months in training camps at Fort Meyer and elsewhere he was promoted to the rank of captain and assigned to the 305th Engineers, 80th Division. He served with this unit in command of Company E until April, 1918, when he was transferred to the 55th Engineers, a broad gage railroad construction regiment. In the latter unit he commanded Company A, serving with that outfit in France until the end of November, 1918. During part of this time he was in charge of building construction on the Chateaureux Storage Depot project. Shortly after the signing of the Armistice he was transferred to Le Havre on special duty with the Base Section Engineers and made engineer in charge of railroad construction. The signing of the Armistice having halted all construction work in the A. E. F., Captain George was among the first officers returned to the States. He landed in Hoboken the latter part of January, 1919, at which time, at his own request, he was honorably discharged from the military service.

He returned to his former poistion as assistant engineer with the Public Service Railway in February, 1919, continuing in that capacity until his recent appointed as engineer maintenance of way. He is a member of the American Society of Civil Engineer, and is also a new member of the Committee on Way Matters of the American Electric Railway Engineering Association. Mr. George is known to many members of the industry through his frequent contributions to the ELECTRIC RAILWAY JOURNAL.

H. H. GEORGE

H. W. Codding is a graduate of the electrical engineering department of the Massachusetts Institute of Technology, class of 1912. He entered the employ of the Public Service Railway in July, 1912, as a cadet engineer. He served in the mechanical, transportation, track and distribution departments of the railway and in the production department of the Public Service Electric Company, and was finally promoted to engineer in the distribution department of the railway, where he served until December, 1917. From December, 1917, to January, 1919, he was employed as assistant to the chief electrical engineer of the New York Edison Company, returning to Public Service Railway on the latter date as engineer in the distribution department. By his recent promotion Mr. Codding becomes distribution engineer.

George H. Haldeman, appointed assistant engineer maintenance of way, is a graduate of the Newark Technical School, class of 1904. He has been employed in various capacities in the engineering department of the railway since 1903. He has held the position of office engineer from 1908 until the time of his appointment to his present position. Prior to his connection with the Public Service Railway he was employed on municipal and city survey work by a firm of surveyors in the city of Newark, and also worked on special track layout with the New York Switch & Crossing Company, with headquarters in the city of Hoboken, N. J.

Nelson A. Baldwin, promoted to special work engineer, was graduated from Barringer High School, Newark, N. J., in 1909. Before joining Public Service Railway he was employed with a Newark firm of surveyors, and at the same time attended classes in the Newark Technical School. Later he completed a course in surveying at Columbia University. His connection with the Public Service Railway dates from September, 1912. During the past eight years he has served as draftsman and as engineer on design of special work.

Morris J. Baller, who is made estimating engineer, is a graduate of the civil engineering department of New York University, class of 1909. Following his graduation he was employed by Terry & Tench on miscellaneous design work. In 1910 he entered the service of Juragua Iron & Steel Company, a subsidiary of the Bethlehem Steel Company, at Juragua, Cuba, where he was employed as assistant engineer on preliminary surveys for a proposed railroad. He joined the Public Service Railway in November, 1910, and has served successively as draftsman, instrument-man and engineer with the Public Service.

In the past two or three years Mr. Baller has been in charge of the preparation of detailed cost report analyses and in the compilation of detailed estimates of track construction and reconstruction work of all kinds. During a portion of the time covered by the war period he served with the United States Bureau of Standards at Washington, where he was assigned to draw up for the Government reports on various phases of electric railway transportation.

Leslie B. Woodruff, promoted to construction engineer, was a student in mechanical engineering at the University of Wisconsin, class of 1903. During the summer months from 1896-1903, he served as foreman of construction with the United States Light House Service on the Great Lakes. He entered the employ of the Public Service Corporation in December, 1903, as a student, spending most of his time in the shops. Two years later he became associated with the engineering department as an inspector on building construction. In April, 1910, he was appointed division engineer, which position he held up to the time of his appointment as construction engineer. He is an associate member of the American Society of Civil Engineers.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER.

SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Year's Buying Has Not Been Heavy

Traction Interests Have Been Purchasing Only for Immediate Necessities in Most Cases, but Outlook for 1921 Is Much Better—Stocks Generally Plentiful

The year just passed has been a hard one for the traction purchasing agent. On his side of it he has been hampered by a shortage of funds which has required that he purchase only at the last minute, in the long run of cases, and then only for his immediate needs.

On the other side the manufacturer of traction supplies has been hampered by production conditions that have virtually been unprecedented in extent. High prices, low supplies of coal and raw materials, freight handlers' strikes, freight tie-ups and congestion, car shortage, labor shortage and inefficiency—all these coupled with a phenomenal demand on the part of the electrical industry as a whole over the first half of the year made it very difficult to supply traction companies on short notice with many items of their needs. At the same time there were of course many items of electric railway maintenance on which quick deliveries could be secured because buying was not very heavy and was in small amounts, and also because certain small stocks were available.

With heavy price reductions in textile, leather and some few other lines there has been anticipation from some quarters of a price reduction in supplies for traction companies. In general these reductions have appeared only in instances where articles are made for the most part from cotton, iron and copper and show relatively little labor cost.

Few extensions have been made in the past year, but during that time many companies have been granted fare increases which should permit them to make these much-needed extensions in the near future. The traction interests are behind in their new work and frequently so in their maintenance and repairs, so it would seem that the coming year should see a great deal of buying.

Short Supply of Track Material Greater Part of Year

During the first three-quarters of the year deliveries on track supplies such as spikes, bolts and nuts steadily lengthened under a steady pressure of demand. Foreign competitive buying aided in piling up a large volume of unfilled orders, especially on bolts. By the first of September, when the scarcity had about reached its height, deliveries of standard railroad spikes averaged two to three months and track bolts three to four months. From then on the situation eased up under slackening demand and canceled orders, until by the end of the year shipments were being made almost from stock in some cases and as long as six weeks on bolts and four weeks on spikes in others. Prices followed an upward trend as a result of high fuel, labor and material costs, but have gradually declined in the last quarter. Prospects for consumption of track material in large quantities by railroads next spring are held to be excellent.

Normal Orders for Brake Shoes

Orders for brake shoes from electric railways were held close to actual requirements and the expected increase in buying from steam railroads following their rate increases did not materialize in the volume that was anticipated. Nevertheless, buying on the whole during the year was about normal. Raw material stocks were reduced to lower levels than usual as shipments of coal, coke and pig iron were slow and irregular for a considerable period. Customers' needs were well taken care of, however, as deliveries of standard shoes for the most part were made from stock. The standardization movement, reducing the number of patterns carried virtually to four styles, aided in this. Orders on behalf of new rolling stock were a negligible factor in the demand.

Demand for Wood Ties Not Up to Standard

Consumption of railroad ties does not seem to have been up to the standard of other years as buying for the most part has been for replacements only. Steam railroads did not enter the market as heavily as was expected the last four months of the year. Stocks of ties at the camps were maintained at good levels, but car shortages for long periods curtailed the supply and made shipments uncertain. An influx of Douglas fir ties is noted in the East and Middle West to supplant oak ties cut along the right of way, as the latter were rather high in cost and uncertain in supply. One factor which served to curtail the supply of ties was the higher prices which timber owners obtained for trees cut into board lumber, while another was a shortage of labor at certain times due to higher wages paid workmen for cutting this same board lumber. Prospects for good demand in 1921 are thought to be excellent as the normal consumption of ties necessary to keep roadbeds in good repair, according to the United States Forest Service, is 100,000,000 to 125,000,000 annually. For the past several years buying has fallen considerably below this figure owing to financial conditions.

Demand for Railway Motors Slackens in Last Half

Sales of railway motors were very gratifying during the first half of 1920, the bulk of the demand, of course, being for motors of the safety-car type in about the proportion of three to one. During the last six months, however, quietness has been the prevailing feature of the market. Inability to obtain control equipment and a shortage of gears, insulating material and various small parts were the chief factors impeding deliveries, which ranged around three to four months for moderate orders of safety-car motors and six to eight months for large types early in the year. These figures gradually improved under the slackening market to about forty-five to sixty days for the safety-car motors and a month longer for heavier types. Raw material, while much easier as to supply, has remained high in price and consequently prices have not changed since a slight increase by manufacturers of safety-car equipment last February.

Waste Supply Curtailed by Textile Mill Shutdowns

Good demand and the curtailed production of textile mills were responsible for short supplies of cotton and wool waste over a large part of the year. Many New England mills cut production to four and even three days per week and some even closed down entirely. This naturally reduced the supply of waste, which is a by-product of textile mills, so that stocks were very low over a long period.

The price trend of waste was still upward the middle of the year, when advances of 2 cents per pound on cotton and 1 cent on wool waste brought the price to 9 to 16 cents for cotton colored, 12½ to 18 cents for cotton white and 16 to 25 cents for wool waste. Prospects of a shortage were removed, however, when demand dropped to almost nothing the latter part of the year. At the same time price decreases were made in view of the lower raw material cost, spot cotton being quoted at 14½ cents now in New York. Quotations recently were 7½ to 12 cents per pound for cotton waste colored and 10½ to 14 cents for white in 100-lb. bales.

Slump in Strong Demand for Trolley and Bell Cord

Demand for trolley and bell cord in 1920 compares very favorably with other years as until comparatively recently the supply of this material was not as large as the demand. A distinct tendency has been noted to replace leather material with braided cotton bell cord. Demand for sash cord from the building trade the early part of the year was partly responsible for prevailing low stocks until the first of November. Deliveries during this period ranged in the neighborhood of one to two months.

The supply of cotton at no time occasioned any great trouble except as shipments were delayed by freight tie-ups. Prices advanced somewhat in the spring, at which time quotations ranged from $.97 to $1.10 per pound according to grade and manufacturer. Following the lower cost of raw cotton, however, quoted now at 14.50 cents New York, trolley and bell cord prices have fallen to a range of 66 to 85 cents per pound. Demand at present is light in character and the supply plentiful for all needs.

Malleable Castings Now Available

The supply of malleable castings has been one of the plague spots in the production of electric railway supplies through a great part of the past year. Foundries which some of the time were forced to operate at as low a capacity as 50 per cent, due to labor shortage, were utterly unable to supply the demand and had to refuse many orders. Prevailing long deliveries in many items in the supply branch of the electric railway industry can be traced largely to this circumstance. Manufacturers were very often forced to use substitutes perhaps higher in price or less efficient. The shortage of coal was another factor in bringing about the extreme long delivery of eight months on heavy castings and ten weeks on light malleable castings. The latter half of the year, as labor became more plentiful and transportation eased up and permitted supplies of coal and raw material to come through, the situation grew better. Deliveries have been steadily improving, but are still far from all that is desired. Prices have remained steady.

Good Volume of Business for Fare Boxes and Registers

The growing use of metal tokens and an increasing tendency to count fares instead of passengers on street car lines resulted in excellent sales of fare boxes, demand being well ahead of 1919 in this respect. Buying of fare registers was also good, but does not present such a uniform increase over a year ago, for some manufacturers report the biggest year of any in sales, while others have met only an average normal demand. Raw material difficulties were experienced by producers, especially in obtaining steel and malleable castings. Fare registers were in better shape as to shipment, as a level of three months' stock was maintained on standard types, though delivery of some ranged as long as four months. Fare boxes, however, could not be shipped from stock, as by midsummer back orders for a period of three months had piled up. Prices have been fairly stable, with some slight increases being made about the middle of the year by some companies that had not taken this step to meet rising material costs in 1919.

Pole and Hardware Sales Good

For the first nine months of the year railways at a distance from lumber regions had trouble getting wood poles and crossarms. Pins were a little easier. Demand was dropping off by midsummer, but even then shipments were by no means certain. They had been virtually impossible from the mills, where stocks were in good shape. But jobbers' stocks were low because of car shortage. In the woods labor was short in the winter and spring, and weather conditions and transportation were such as to hamper seriously the delivery of poles. Production during the present winter is expected to be better than that of last year.

Car movement improved in the late summer and fall and poles and arms are moving in good shape now from pretty good stocks. Buying has been good for maintenance purposes, and this condition should continue because of the general policy of keeping purchases down to present needs.

For steel towers the foreign demand has kept up, while domestic has been light. Shipments run from about four to seven months.

Line hardware buying opened up well in the spring and continued at a good rate right through the year, mostly, however, for near-by demands only. While stocks started in good condition, they soon petered out when strikes in the steel mills and car shortage cut down production in May and June. These stocks were still short when winter set in.

High-Tension Porcelain Hard to Get

Shipments of high-tension insulators, bushings, etc., are still ruling long, from three to eight months being quoted, depending on type and voltage. This has been probably the hardest bit of supply material for electric railways to lay hands on for the whole year. Demand for domestic uses has in general been good all year and when it has dropped off the foreign demand has held up well. All this has had its effect upon the production of high-tension porcelain for traction use. There has not been so much buying for new extensions but rather for maintenance work.

Early in the year production was off as much as 40 per cent in some instances because of the inability to get labor for the kilns, its inefficiency and its independence. Unsatisfactory production resulted and prices went up. Also malleables were short. These conditions have since been rectified to an extent, but shipments have not shortened very much.

Steam Coal Prices Decline

Supply Greater Than Demand with Many Industries Shut Down—Speculation Is Past

"The coal market is saturated," declared an official of one of the large Middle Western coal sales companies last week. The poorer grades of steam coal have dropped from $2 to 83 cents a ton in the Central West, while the better grades that have sold at from $7 to $8 are now going begging at from $3.50 to $4. In some cases coal that sold at from $8 to $10 a few months ago is now going at $3 per ton.

"There is a greater supply than demand," said George W. Reed, vice-president of the Peabody Coal Company, in a public statement last week. "Industries have shut down all over the country. They have no further use for fuel. Conditions are beginning to readjust themselves. I would say that the drop in the price of coal is simply an indication of business getting down to normal competitive prices."

The indications in the entire Middle Western territory are that the wild speculation of the last few months is past and that the coal industry is settling down on a normal basis with no danger of shortage except in a few spots where transportation may be hindered if severe winter weather should develop suddenly.

100 More Cars for N. Y. Municipal Railway

The New York (N. Y.) Municipal Railway, through an order signed the first part of this week, is authorized by the Public Service Commission to purchase 100 additional steel subway cars for use on the Municipal Railway lines. The order will go to the Pressed Steel Car Company at a price said to be $36,410 each. The cars are a duplicate in construction to the previous order of 100 cars placed with the Pressed Steel Car Company last May. These were equipped with Westinghouse type A. M. U. E. air brakes, Westinghouse type A. B. F. control and General Electric type 248-A motors. Seating capacity is about ninety persons. It is expected that the new cars will be ready for delivery in 18 months. This latest order makes the ninth lot of 100 cars of this type that have been ordered by the company. About 600 of these had been delivered up to Oct. 1 last, on which date the first of the seventh lot of 100 cars were to be delivered.

Rolling Stock

The London (England) County Council has contracted for 125 new tramcars. There were separate bids by British manufacturers for the bodies, trucks, electrical equipment and magnetic brakes, which bring the total cost to approximately £4,300 per car, or at present exchange rates about $15,050. This is said to set a record price for cars of this type in England. In 1910 the cost of a similar car was £880. The cars will be of the eight-wheel bogie type, double decked, with roof seats enclosed, and a total seating capacity of about eighty people. Delivery is to begin in forty-two weeks from the date of order.

United Railways Company of St. Louis, Mo., through Colonel A. T. Perkins, manager under the receiver, will request permission from Judge Lamm to buy fifty more cars of the large 777 type in the near future. Fifty cars of this type are being made in the company's shop, three are in operation and sixteen more will be completed about Jan. 1. It is expected that all will be in operation by March 1.

Power Houses, Shops and Buildings

Pacific Electric Railway, Los Angeles, Cal.—Construction on the new Pacific Electric depot at Wilmington is under way. The structure will cover a space 24 ft. x 60 ft. It will consist of two waiting rooms, ticket office and express room.

Union Traction Company, Nashville, Tenn.—The City Council of Gallatin is negotiating with the Union Traction Company, Nashville, for furnishing power to the city of Gallatin, Tenn., for lighting and motive power. The contracts will call for erecting a line from Nashville to Gallatin over the right-of-way of the Union Traction Company, operating an interurban railway between the two cities. A substation will be erected between the two cities. The present power plant of the city of Gallatin is inadequate to meet the growing demands for lighting, but will be retained for use in emergencies.

Track and Roadway

Interborough Rapid Transit Company, New York, N. Y.—Construction of the Queensboro subway will be started within the next few months and according to the transit commissioner the work will be rushed to completion. This extension will be an improvement over the shuttle system in operation between Grand Central and Times Square. Under the proposed new scheme passengers from Queens en route north and south on the west side will remain on the trains to Seventh Avenue and Times Square.

Seattle (Wash.) Municipal Railway.—D. W. Henderson, superintendent of the Seattle Municipal Railway, has recommended to Mayor Hugh M. Caldwell and the City Council the undertaking in 1921 of ten municipal railway extensions and betterments, estimated to cost between $543,713 and $583,853. The proposed improvements affect Ballard, the Green Lake and University districts, First Hill, Rainier Valley, Georgetown and the waterfront district toward Georgetown. Mr. Henderson states that all the improvements are absolutely necessary. He urges that the necessary steps be taken to issue bonds to secure money for the extensions. In addition, the sum of $20,000 will be required to purchase feed wire.

Toronto, Ont.—The recommendations of the Board of Control that the Transportation Commission be empowered to expend $500,000 on additional car lines in Ward 7 was referred back by the City Council.

Toronto, Ont.—Mayor Church proposed to the City Council that the Board of Control report on a by-law to provide street railway accommodation for West Toronto.

Hydro-Electric Power Commission, Ottawa, Ont.—Surveys are being made by the engineers of the Hydro-Electric Power Commission with a view to constructing an extension of the railway lines along Ottawa Street, Erie Street and Parent Avenue, Windsor. Application will be made to the Ontario Legislature at its next session for permission to issue $1,000,000 of bonds for this purpose.

Trade Notes

The Worthington Pump & Machinery Corporation, 115 Broadway, New York City, is receiving bids for the erection of a one-story, 50 ft. x 75 ft. addition to its plant at St. Bernard, Ohio.

The Absolute Con-tac-tor Company, Chicago, has moved its factory from 2003-2005 Larrabee Street to larger quarters at 4056-4058 Armitage Avenue. The offices of the company remain at 127 North Dearborn Street.

The Lincoln Revolving Transformer Company, Cleveland, Ohio, recently organized by J. C. Lincoln, president of the Lincoln Electric Company, to manufacture a revolving type of tranformer developed by Mr. Lincoln, has established a plant at 2400 Woodland Avenue.

British Export Register Out.—The export register of the Federation of British Industries has been published by that federation, 39 St. James Street, London, S. W. Among the 650 pages are given the federation's constitution, aims, etc., list of members with their manufactures classified, and advertisements.

The O. M. Edwards Company, Inc., Syracuse, N. Y., manufacturer of window fixtures, platform trap doors, etc., announces the appointment of C. A. Eggert, who for a number of years was connected with the sales department of the Consolidated Car Heating Company, as sales manager for the central district, with offices at 1425 Edison Building, Chicago, Ill.

The C. & G. Cooper Company, Mount Vernon, Ohio, engine builder, has made a number of changes in its organization during the year. At the regular meeting held in June the following officers were elected: B. B. Williams, president and general manager; F. H. Thomas, vice-president in charge of sales; Mr. Taylor, secretary in charge of production, and W. L. Daney, treasurer. The company reports an increasing volume of business.

The Chase-Shawmut Company, Newburyport, Mass., announces the appointment of H. C. Moran, Keystone Building, Pittsburgh, Pa., as district representative for the following territory: Western Pennsylvania, Ohio, Kentucky and West Virginia. The Engineering Equipment Company, 1011 Chestnut Street, Philadelphia, Pa., has also been appointed district representative for eastern Pennsylvania, New Jersey and Maryland.

Charles Lyman Rand, secretary and chief chemist of the Mitchell-Rand Manufacturing Company, New York, manufacturer of electrical insulation, has relinquished his duties as factory superintendent to devote his entire time to important research work in the chemical and allied fields for his company. He will be succeeded as factory superintendent by Joseph T. Lawrence, chemical engineer, formerly associated with E. I. du Pont de Nemours & Company.

New Advertising Literature

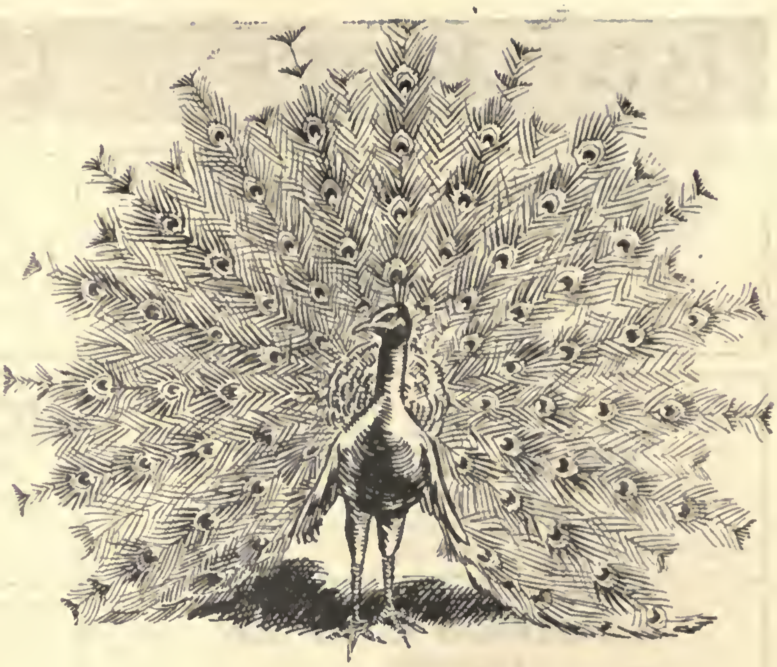
Oilers.—The Eagle Manufacturing Company, Wellsburg, W. Va., has issued catalog No. 20, covering its different types of oilers.

Electrical Instruments.—The Burton-Rogers Company, 755 Boylston Street, Boston, Mass., sales department for the Hoyt electrical instruments, has issued a catalog of Hoyt electrical instruments, including dashboard, miniature switchboard, large switchboard and portable instruments.

Small Turbo - Generator Sets.—The General Electric Company, Schenectady, N. Y., has published bulletin No. 42,-010A, which supersedes bulletin No. 42,010, describing and illustrating the small Curtis steam-turbine generating sets. These generating sets have a capacity of 100 kw. to 300 kw. and are mounted on a common base with turbine and gearing.

Power Plant Specialties.—The Plant Engineering & Equipment Company, 192 Broadway, New York City, has issued a twenty-page catalog covering its "Peeco" specialties, including steam traps, separators, strainers, regulating devices, blowers, meters, etc.

The Happy New Year Will Be of Good Cheer If You Brake with Peacocks You Need Never Fear



G. M: "How is the budget?"
"Have we included everything absolutely essential and cut out more items we can get later?"

Supt. Transportation: "Everything we must have is in. Of course, that includes the hand brakes for our 20 new cars and for those ten old ones we're rebuilding."

G. M: "What did you and the Superintendent of Equipment finally decide on?"

Supt. Transportation: "Peacocks, but we're leaving it to the Brake Company to decide which brake is the best for our particular requirements."

G. M: "Good, and now I wish both you and 'Mac' a Happy New Year."

Type "G" Peacock

NATIONAL BRAKE CO., Inc.
888 Ellicott Square, BUFFALO, NEW YORK

Bankers and Engineers

Ford, Bacon & Davis,
Engineers.
115 BROADWAY
NEW YORK

THE J. G. WHITE ENGINEERING CORPORATION
Engineers—Constructors
Industrial Plants, Buildings, Steam Power Plants, Water Powers, Gas Plants, Steam and Electric Railroads, Transmission Systems
43 Exchange Place, New York

STONE & WEBSTER
Incorporated
Design and Construct Steam Power Stations, Water Power Developments, Transmission Lines, Substations, Gas Plants.
NEW YORK BOSTON CHICAGO

JOHN A. BEELER
OPERATING AND RATE INVESTIGATIONS
TRAFFIC SURVEYS AND SCHEDULES
MANAGEMENT - CONSTRUCTION - APPRAISALS
DIFFICULT WORK EXECUTED
52 VANDERBILT AVE., NEW YORK

SANDERSON & PORTER
ENGINEERS
REPORTS, DESIGNS, CONSTRUCTION, MANAGEMENT
HYDRO-ELECTRIC DEVELOPMENTS
RAILWAY, LIGHT and POWER PROPERTIES
CHICAGO NEW YORK SAN FRANCISCO

A. L. DRUM & COMPANY
CONSULTING AND CONSTRUCTING ENGINEERS
VALUATIONS AND FINANCIAL REPORTS
CONSTRUCTION AND MANAGEMENT OF ELECTRIC RAILWAYS
76 West Monroe St. CHICAGO, ILL.

THE ARNOLD COMPANY
ENGINEERS—CONSTRUCTORS
ELECTRICAL—CIVIL—MECHANICAL
105 South La Salle Street
CHICAGO

ENGELHARDT W. HOLST
Consulting Engineer
Appraisals, Reports, Rates, Service Investigation, Studies on Financial and Physical Rehabilitation Reorganization, Operation, Management.
683 Atlantic Ave., Boston, Mass.

ALBERT S. RICHEY
ELECTRIC RAILWAY ENGINEER
WORCESTER POLYTECHNIC INSTITUTE
WORCESTER, MASSACHUSETTS

WE BUILD TRACKS
Construction—Maintenance—Rehabilitation
ENGEL & HEVENOR
Track Engineers—Contractors
220 Broadway, New York City

REPUBLIC ENGINEERS, INC.
CONSULTING AND CONSTRUCTING ENGINEERS
Valuations Reports Investigations
Designs Construction Management
60 BROADWAY, NEW YORK
CLEVELAND, OHIO YOUNGSTOWN, OHIO
Illuminating Bldg. Mahoning Bank Bldg.

ROBERT M. FEUSTEL
CONSULTING ENGINEER
Rate, Traffic and Reorganization Investigations
Fort Wayne, Indiana

C. E. SMITH & CO.
Consulting Engineers
2065-75 Railway Exchange Bldg., St. Louis, Mo.
Chicago Kansas City
Investigations, Appraisals, Expert Testimony, Bridge and Structural Work, Electrification, Grade Crossing Elimination, Foundations, Power Plants

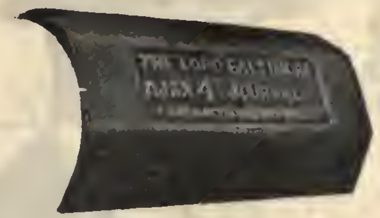
WALTER JACKSON
Consultant
FARES, BUSES, MOTOR TRUCKS
More revenue from more riders
143 Crary Ave., Mt. Vernon, N. Y.

HEMPHILL & WELLS
CONSULTING ENGINEERS
Gardner F. Wells Albert W. Hemphill
APPRAISALS
INVESTIGATIONS COVERING
Reorganization Management Operation Construction
43 Cedar Street, New York City

Parsons, Klapp, Brinckerhoff & Douglas
WM. BARCLAY PARSONS H. M. BRINCKERHOFF
EUGENE KLAPP W. J. DOUGLAS
Engineers—Constructors—Managers
Hydro-electric, Railway, Light and Industrial Plants, Appraisals and Reports.
CLEVELAND NEW YORK PORTSMOUTH, VA.
Leader News Bldg. 84 Pine St. Ferry Bldg.

AJAX—The Ideal Bearing Metal

TRADE MARK



Ajax Car Brasses have been the leaders for forty years.

will help cut your maintenance costs.

"Making your own bearings" sounds fine but now it takes material which is high and labor which is higher.

By specifying Ajax car brasses you guarantee yourself against trouble. At the same time you get car brasses made with the same precision and accuracy as a car wheel.

By specifying Ajax check plates, you insure yourself against the high labor costs of replacements.

By specifying Ajax Ball Bearing Alloy, you get the most economical and dependable lining for brasses and axle bearings.

Ajax Check Plates last longer because they're made better.

THE AJAX METAL COMPANY
Established 1880
Main Office and Works: Philadelphia, Pa.
Southern Plant: Birmingham, Ala.

JAMES E. ALLISON & CO.
Consulting Engineers
Specializing in Utility Rate Cases and Reports to Bankers and Investors
Security Building, St. Louis, Mo.

Byllesby
Engineering & Management Corporation
208 S. La Salle Street, Chicago
New York Tacoma

J. L. JACOBS & COMPANY
Engineers—Statisticians
Investigations—Reports—Expert Testimony
Management, Organization and Cost Control
Industrial Relations Problems—Statistical Analyses
Monadnock Building, Chicago

KELLY, COOKE & COMPANY
Engineers
149 BROADWAY NEW YORK
424 CHESTNUT STREET PHILADELPHIA

THE P. EDWARD WISH SERVICE
DETECTIVES
Street Railway Inspection
50 Church St. NEW YORK
131 State St. BOSTON

DAY & ZIMMERMANN, INC.
ENGINEERS
Design, Construction
Reports, Valuations, Management
NEW YORK PHILADELPHIA CHICAGO

ELECTRICAL TESTING LABORATORIES
Electrical, Photometrical and Mechanical Testing
80th Street and East End Ave., New York, N. Y.

Scofield Engineering Co.
POWER STATIONS
HYDRAULIC DEVELOPMENTS
Consulting Engineers
PHILADELPHIA, PA.
Gas Works
Electric Railways

The Most Successful Men in the Electric Railway Industry read the
ELECTRIC RAILWAY JOURNAL
Every Week

Frederick Sargent
Wm. S. Monroe
SARGENT & LUNDY
Incorporated
A. D. Lundy
James Lyman
Mechanical and Electrical Engineers
1412 Edison Bldg., 72 W. Adams St., Chicago, Ill.

Your Advertising is YOU
SEARCHLIGHT SECTION
Sound Plant in Good Operating Condition For Sale
UNITED STA
NT CO., 208 S. La Salle St., Chicago
EQUIPMENT
FOR SA RENT
CLAPP, NORSTROM & RILEY EQUIPMENT CO.
For Sale or Rent
REPAIR EQUIPMENT
H. KLEINHANS CO., Arcade, Pittsburgh, Pa.
KLEINHANS

Frequently the only impression of your business possessed by a prospective customer is gained through your advertising. The way you use the space in the magazines he reads gages the way he thinks of your ability to serve his needs, to make prompt deliveries, to repair what he wants repaired, to buy what he has to sell. And this impression counts heavily in swinging business to *you* when all the quotations he receives run about the same. Far-sighted dealers know that steady advertising creates profitable prestige.

Keep Advertising in the

SEARCHLIGHT SECTION

HASKELITE HEADLINING

Does not Bulge or Sag, Shrink or Split

Stronger than Steel per Unit of Weight and Lighter than Wood Pulp Boards

Haskelite is a scientifically built plywood glued with an insoluble glue. These horseshoe bends were made of flat 3-ply strips softened by boiling. No separation of plies. No worry from leaks in the car roof when Haskelite Headlining is used.

Haskelite may be made in very large sheets.

This panel is 53 ft. long.

Haskelite Headlining is made to dimensions called for by the car builder. Saves labor. Eliminates waste.

Haskelite in the 3-16 inch and 1-4 inch thickness is commonly used for car lining but it is also furnished in many other thicknesses.

Haskelite Manufacturing Corporation
Chamber of Commerce Building
CHICAGO, ILLINOIS

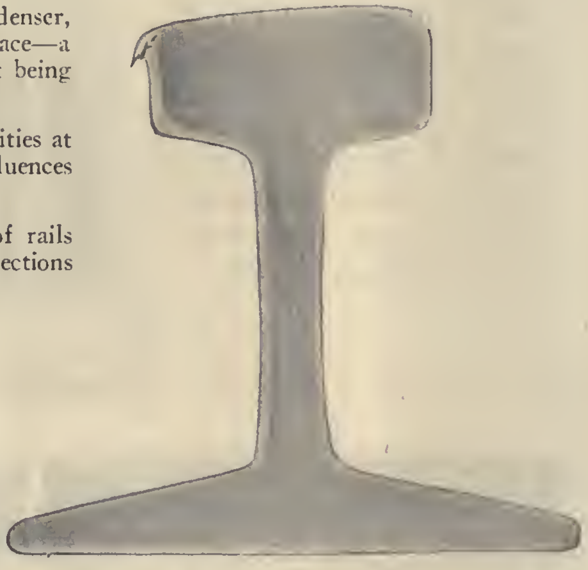
Lackawanna Deseaming Process

Reduces Wear on Rail Heads and makes Car Wheels last longer

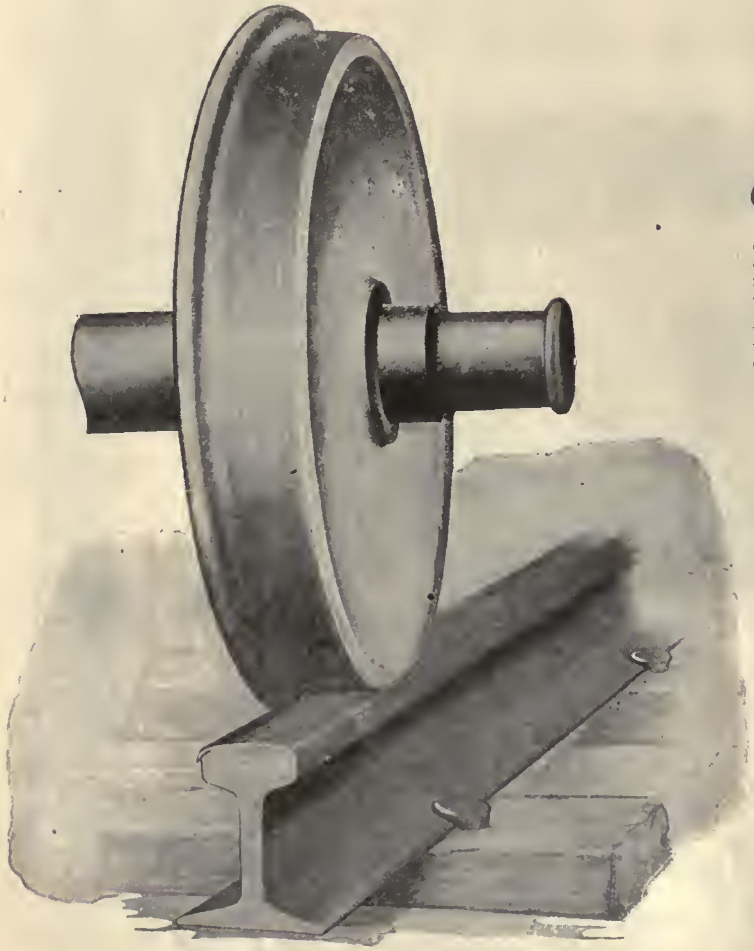
Authorities agree that in any hot-rolled shape, the interior metal is denser, more homogeneous, stronger and harder than the metal at the surface—a condition which results from the original surface metal of the ingot being rolled into the finished shape.

Metal at the ingot surface entraps air and is subjected to the impurities at the surface of the ingot mold, and later is subject to oxidizing influences in the soaking pits.

That this softer, weaker metal is actually present in the surfaces of rails made in the ordinary way is proven by examination of etched rail sections under the microscope and by faults developed in the rail in service.



Cross section of a rolled steel rail, showing the skin surface exaggerated and how the soft metal sloughs off the head under the cold rolling action of the wheels. The partly decarburized surface metal of the ingot is smoothed out and stretches in the ordinary rolling process and it still remains weak. As far as the rail head is concerned, the action of wheels in service merely continues the stretching until the distortion of the head makes the rail useless.



Every experienced railroad man has noticed how the soft metal wears off the rail head unevenly and uncertainly, leaving humps on the steel surface and slivers of soft steel sloughed off at the side of the rail head.

It takes quite a while for wheels to cold roll the soft decarburized surface metal off the rail head before the hard interior metal of the rail begins to offer resistance.

The wearing down of the rail head during this period and the irregular running surface finally developed impose extra duty on the car wheels. Both wheel and rail surfaces wear out sooner than they should and this means unnecessary maintenance expense.

ALL LACKAWANNA RAILS ARE DESEAMED

Lackawanna Deseamed Rails eliminate these faults in the only logical way. They are rolled the same as ordinary rails except that after the roughing passes the weak surface metal at the location of the rail head and base is *hot-milled off* and in the final passes the rolls are applied directly to the hard interior metal at these vital points.

The milling machine for accomplishing this was designed entirely by our own engineers and under our own exclusive patents. Long experience in rail manufacture enables us to state positively that this process is a decided advance in rail making and worth much money to the rail user, yet we charge no more for Lackawanna Deseamed Rails than you would pay for others less satisfactory.

The Lackawanna Deseaming Machine at work. The milling cutters take a generous depth of metal off the top and the bottom of the rail bar on its fifth pass through the mill.

Send for our book "Lackawanna Deseaming Process"

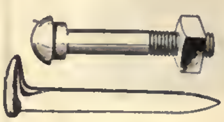
Other Lackawanna Aids to Better Track

The Lackawanna Safety-Head Angle Bar

overcomes liability to wear and fracture by preventing cutting of the bar at the top from back action or upward thrust of the rail ends. This is accomplished by a slight depression in the head of the angle bar for a short space at the center where the rail ends meet.

The Lackawanna Hook-Shoulder Tie Plate

is simple, strong, durable, convenient for installation, and by holding the rail with great security prevents undue wear and destruction of material; saves repair costs and reduces maintenance labor.
Two ribs on top form a channel in which the rail base rests. One of the ribs is plain and the other hooked to make a holder. One or two plain spikes in the plain rib complete the bond between plate and both rail flanges. The plate is fastened to the tie by independent plain or screw spikes. The rail may be removed without disturbing the plate.



Lackawanna Track Bolts & Spikes

Our track bolts and spikes, of all standard sizes for light or heavy rails, enjoy an enviable reputation for careful, accurate workmanship and finish.

The Abbott Rail-Joint Plate

The ABBOTT RAIL JOINT PLATE
"BUILT LIKE A BRIDGE"

strengthens and otherwise improves ordinary angle bar joints of standard and light tee and girder rails. Its use assures smooth running track surface without the necessity of constantly raising and tamping the joint ties, avoids annoyance and expense from worn and broken bolts and angle bars and protects the rail ends from battering and breaking down.

The hard steel and combination of reversed flanging within the plate provides for internal stresses and imposes the load on the two joint ties with about the same action as between a short deck bridge and its piers. Upturned corner lugs engaging the ends of the angle bars act as anti-creepers and as rail guards to prevent misalignment if the angle bars break or become loose.

Abbott Plates are equally applicable to and advantageous on new or relaid track and will extend the life even of old track for several years. These plates are made in types especially suitable for ordinary steam railway service, for use in paved streets, and for welding to the rail base, and may be held with either screw or ordinary spikes.

Write for our Booklet

"Improved Track Appliances"

Lackawanna Steel Company

General Sales Office and Works: Lackawanna, N. Y.

Boston Buffalo Chicago Cincinnati Cleveland Detroit New York Philadelphia St. Louis San Francisco

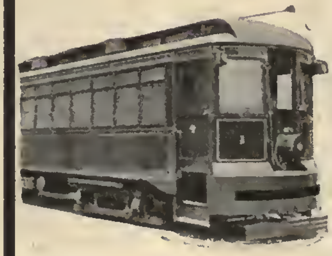
508

SOLE EXPORTER OF OUR COMMERCIAL PRODUCTS CONSTECO CONSOLIDATED STEEL CORPORATION 165 BROADWAY, NEW YORK, U.S.A.

Exide

Chloride Accumulator Exide-Ironclad

Batteries for Every Kind of Railway Service



High-Voltage Direct-Current Locomotives
Direct current for operating compressor motors and auxiliary control apparatus during interruption of normal power supply is important. The Exide-Ironclad Battery has been furnished for a number of large electric locomotives of this type.

Multiple Unit Control
A number of railways use the Chloride Accumulator to furnish a supply of low voltage current in connection with the operation of multiple unit control systems.

Interurban Car Lighting
Exide Batteries are being used to provide continuous lighting at highway crossings and switches or during other similar interruptions of power.

Storage Battery Cars
The Exide Batteries are economically and profitably solving the problem of car operation where other methods cannot be used to advantage.

Head and Tail Lights
Exide Batteries are giving ideal service for this purpose during interruption in power supply.

Load Regulation
The Chloride Accumulator is aiding in carrying of peaks and fluctuations of load.

Freight and Baggage Industrial Trucks
Exide-Ironclad Batteries used in storage battery trucks give a maximum service at minimum cost. They are Rugged, Efficient and Economical.

For Testing in Electrical Repair Shop
The Exide Portable Battery is used, and a special battery of this type has been designed for high discharge rates.

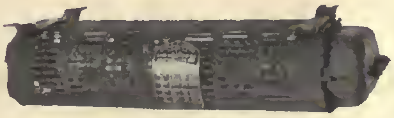
THE ELECTRIC STORAGE BATTERY CO.
Oldest and largest manufacturers in the world of Storage Batteries for every purpose
1888 PHILADELPHIA 1921
Branches in seventeen cities
Exide Batteries of Canada, Limited, 133-157 Dufferin St., Toronto, Canada.

Good Coal—is it going to run your cars—or to *heat* them?

to run them—if you install

Consolidated Electric Heaters

with Thermostatic Control



Cross Seal Type Elec. Heater

Watch your coal pile. Watch the hard-to-get lines of coal cars as they deliver their precious burdens. And conserve that coal for *useful*, revenue producing purposes instead of wasting it—draining it away—on heating cars. The economical coal-saving way is to specify and install Consolidated Electric Heaters.

Consolidated Electric Heaters are recognized nearly everywhere as the ideal car heating equipment. With Consolidated Thermostatic Control a constant temperature is maintained, thus keeping the current consumption down to a minimum. The car temperature is maintained at exactly the right point, and this regulation is absolutely automatic. Do not fool with imitations of the real thing; specify Consolidated Electric Heaters with Thermostatic Control for your new cars.

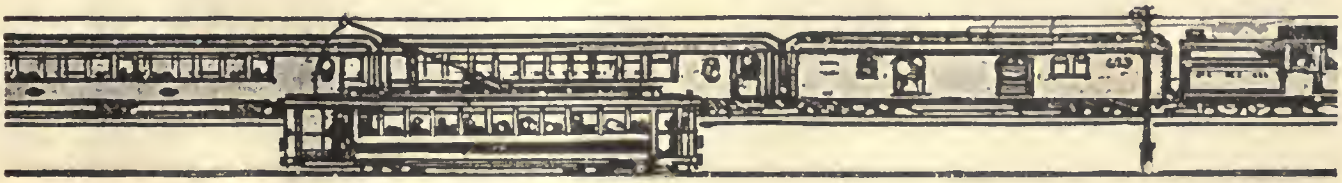
Thermostat

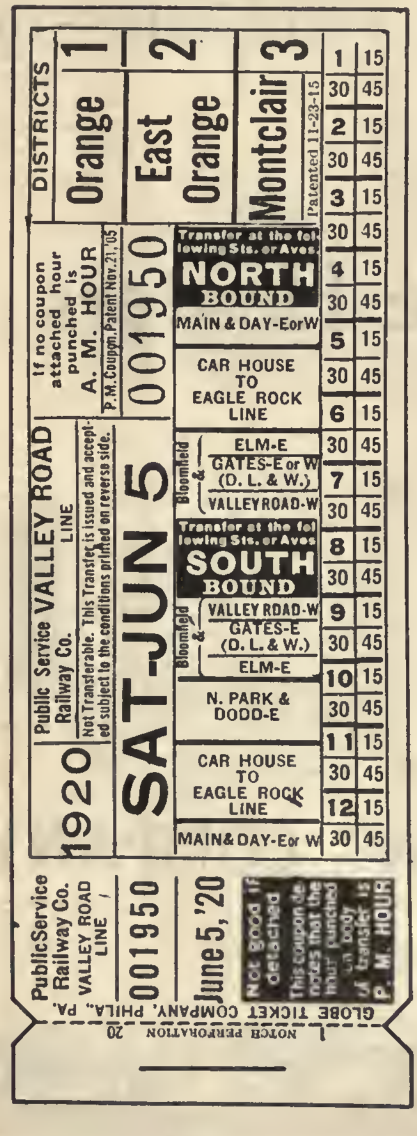
Maintenance a minimum. Write for details.

CONSOLIDATED CAR-HEATING COMPANY

Albany, New York

New York City Chicago Coaticook, Quebec





DISTRICTS

Orange 1

East Orange 2

Montclair 3

Patented 11-23-15

Public Service Railway Co. VALLEY ROAD LINE

If no coupon attached hour punched is A. M. HOUR

P.M. Coupon. Patent Nov. 21, '05

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Transfer at the following Sts. or Aves.
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CAR HOUSE TO EAGLE ROCK LINE
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VALLEY ROAD-W

Transfer at the following Sts. or Aves.
SOUTH BOUND
VALLEY ROAD-W
Bloomfield & GATES-E (D. L. & W.)
ELM-E
N. PARK & DODD-E
CAR HOUSE TO EAGLE ROCK LINE
MAIN & DAY-E or W

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30	45
2	15
30	45
3	15
30	45
4	15
30	45
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12	15
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Public Service Railway Co. VALLEY ROAD LINE
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June 5, '20
Not good if detached
This coupon denotes that the hour punched in body of transfer is P. M. HOUR

GLOBE TICKET COMPANY, PHILA., PA.

NOTCH PERFORATION 20 1

Speed Up Loading with Globe Tickets

Get your cars away quicker and avoid those costly delays that take away the rush hour revenue.

Stimulate Riding with Globe Tickets

They are not only a convenience but a necessity. Increased riding has averaged 19% even with higher fares when paid by tickets.

Sales of tickets at reduced rates, such as 4 tickets for 25 cents where the fare is 7 cents cash, or larger quantities bound in books, together with the known fact that the popular feeling against higher fares wears off in a short time, has enabled railways to increase riding as high as 30% with Globe tickets.

P. M. Coupon Transfers Prevent Abuse

"Millions of them are used every day."

There is no other transfer that gives such instantaneous action, such protection from transfer abuse—as the P. M. coupon. On one man cars much time may be saved—for there is no punching of A. M. or P. M. time—the coupon eliminates the necesssity of that. They have been used continuously by some large systems for more than fifteen years.

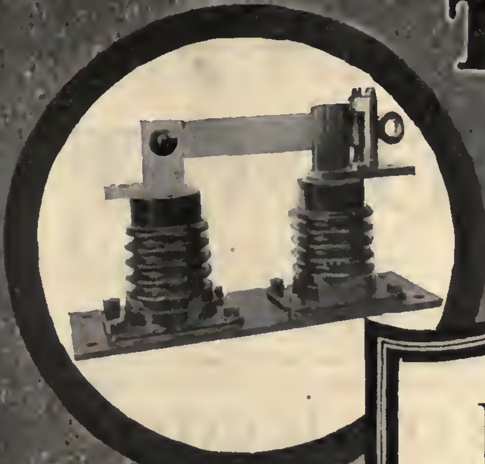
GLOBE FARE TICKETS

are the answer to the odd fare problem. These handy tickets are sold in book and strip form—like a commuter's ticket—and may be torn off as used. No bother with odd change—consequently a saving of time.

Globe paper fare tickets will help collect the odd fares faster than were ever rung up.

Shall we send you samples?

GLOBE TICKET COMPANY
112-114 North 12th Street, Philadelphia, Pa.



The Safer Line of "FRANKLIN" Generating Station Equipment

EACH of these devices has been added to the "FRANKLIN" Line only as we have found a way to make a safer pothead, busbar insulator, disconnecting switch or whatever it is. The prime purpose in designing them has not been size or cost—but safety. Each time we sought not just a different but a *better* way —and found it.

As you well know, the all-important thing in buying such equipment for your plant is to make sure of safety and reliability in service. An accident to an employe or to the service costs far more than the bit of apparatus that has caused it. And safety is the cheapest thing that you can buy.

It pays to buy the "FRANKLIN"—because the "FRANKLIN" brings perfection both mechanical and electrical plus an added element of safety that has improved on every competing device.

"You. can install the 'FRANKLIN' and forget it." Write for bulletins and see why each one is safer and better for your use.

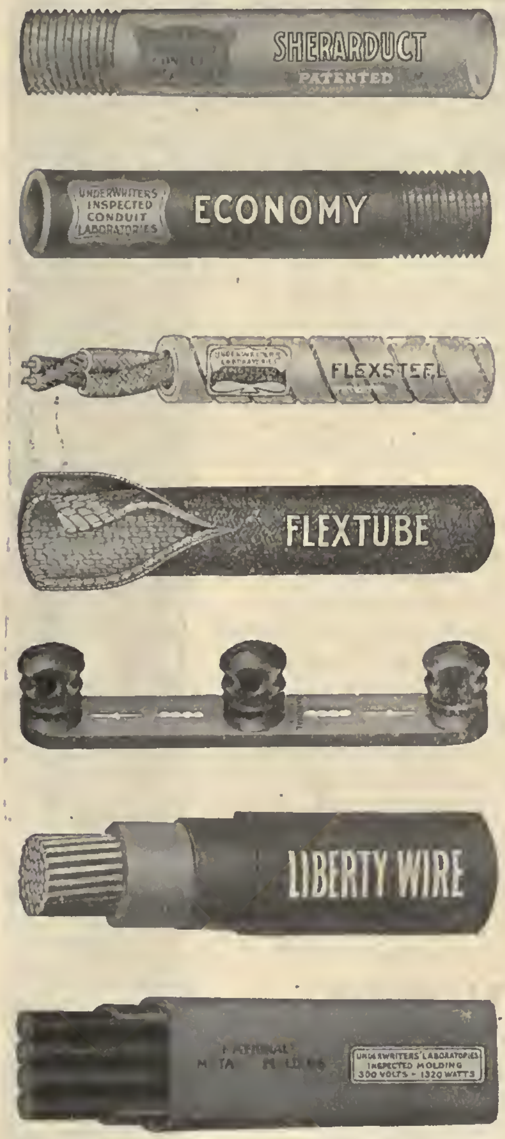
ELECTRICAL DEVELOPMENT
& MACHINE COMPANY
Philadelphia

Sales Agents

Eastern States
UTILITY PRODUCTS CORPORATION
50 Church Street New York City

Central States
MIDSTATES ENGINEERING COMPANY
Westminster Building, Chicago, Illinois

NATIONAL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UNDERWRITERS' LABORATORIES INSPECTED MOLDING 300 VOLTS - 1320 WATTS

PRODUCTS

Are

"All You Require When You Wire"

ANY railway can secure from National Wiring Products material for the *entire* wiring job for cars, power house, substations, etc. No waiting for deliveries from different suppliers; no following up of many requisitions; no writing or wiring to several organizations.

A complete set of our convenient and helpful Correspondence Folder Catalogs will be sent you upon request.

National Metal Molding Co.

General Offices: Pittsburgh, Pa.

Atlanta
Boston
Chicago
Denver
Detroit

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New York
Philadelphia
Portland
Salt Lake City
San Francisco

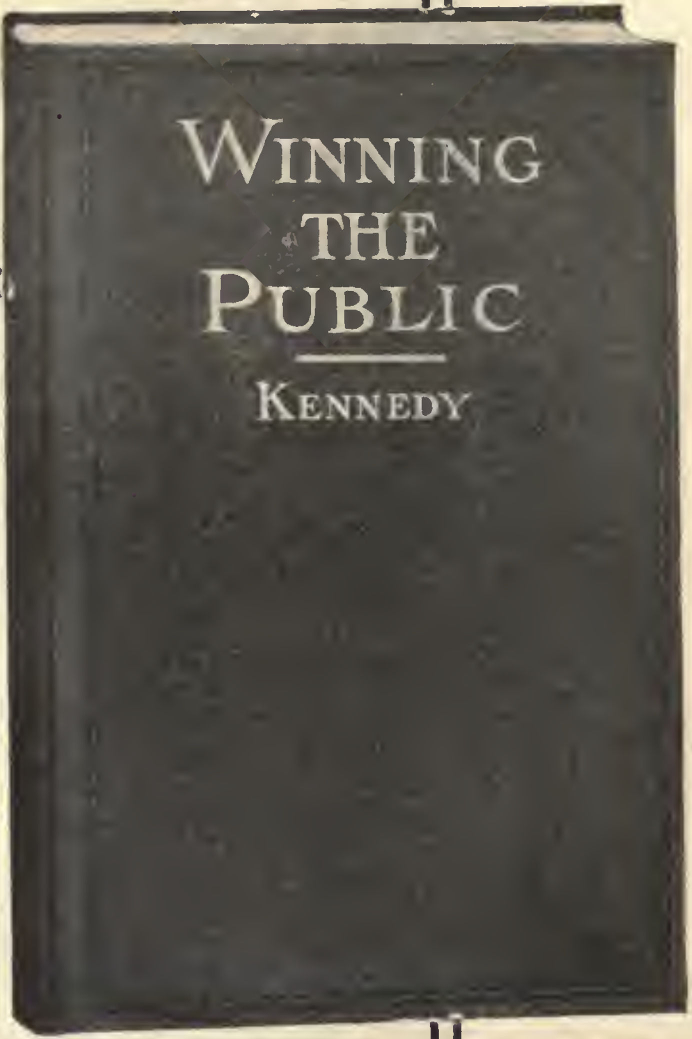
Seattle
Buenos Aires
Rio de Janeiro
Sao Paulo, Brazil
Lima, Peru
Santiago, Chile

Medellin, Colombia
Havana
Manila
Mexico City
Shanghai, China

Canadian Distributors: Canadian General Electric Co., Limited.

National Products are sold by Electrical Jobbers in every section of the country.

An inspirational book for the entire electrical industry—



For the central station corporation, for any public utility, for executives of such companies, for their employees, for the entire electrical industry—the key to success is *service*. Service of the right kind means expansion for the industry, bigger business for the power company, more pay and promotion for the employee of such a company. Mr. Kennedy in this new book has written the first textbook of service. He shows how to serve effectively. He proves that service brings success to the individual and to the corporation.

WINNING THE PUBLIC

By S. M. Kennedy

Vive-President in charge of Public Relations and Business Development,
Southern California Edison Company

168 pages, 6x9, illustrated, $2.50 net, postpaid

Mr. Kennedy is a public service official of wide experience. He tells in his book how his own company and other successful public utility companies win the public through service. He gives central station executives useful hints on business development. He presents practical ideals for the consideration of department heads. He offers to public utility employees promotion-winning information. His book should be in the hands of every public utility official and employee, for it points the way to a broader field for the electrical industry and a greater success for all connected with the industry.

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Examine it for 10 days FREE

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EXPORT TRADE can help America NOW

WRITERS and speakers have repeatedly urged the great and growing need of export trade on the part of American industries.

With normal domestic consumption below our greatly expanded facilities for production, foreign trade is vital to our continued prosperity and progress. Fluctuations of demand in the home market today emphasize the special value of foreign trade as a compensating force tending to offset the disturbing influence of such fluctuations.

Foreign trade can help America NOW—and American producers and sellers can best serve the national welfare, and their own interests by equipping for successful trading in the foreign field.

SUCCESSFUL foreign trading is founded on an exact understanding of the market. In fact, this truth holds good in all trading—domestic as well as foreign. But in foreign commerce it is imperative.

It is, then, an immediate essential in the promotion of foreign trade to seek the aid of agencies through which information of dependable character, and in a form directly usable by *you* in relation to the market possibilities and conditions affecting *your* particular commodities, can be obtained.

The means of foreign sales promotion adopted should, moreover, be especially organized to present *your* special proposition in just the right way to just the right people.

INGENIERIA INTERNACIONAL provides this double service to the manufacturer and export manager seeking to market machinery and industrial equipment in Latin America and Spain.

Its *Research Department* has exact information available to *you* in regard to a great variety of general and specific products of the above mentioned character in these fields.

Fifteen thousand engineers and industrial executives look to each issue of INGENIERIA INTERNACIONAL for dependable and exact information on engineering progress and accomplishment, and for data on machinery and equipment, vouched for by publication in its advertising pages.

Through its comprehensive knowledge of Latin American and Spanish engineering and industrial conditions and needs, INGENIERIA INTERNACIONAL has earned the confidence of the Latin American and Spanish engineering and industrial executive in the integrity and value of its service.

In so doing, INGENIERIA INTERNACIONAL has created ready to your hand, an instrument especially adapted to win for American machinery and industrial equipment and materials—YOUR products — the *buying confidence* and patronage of Latin America and Spain.

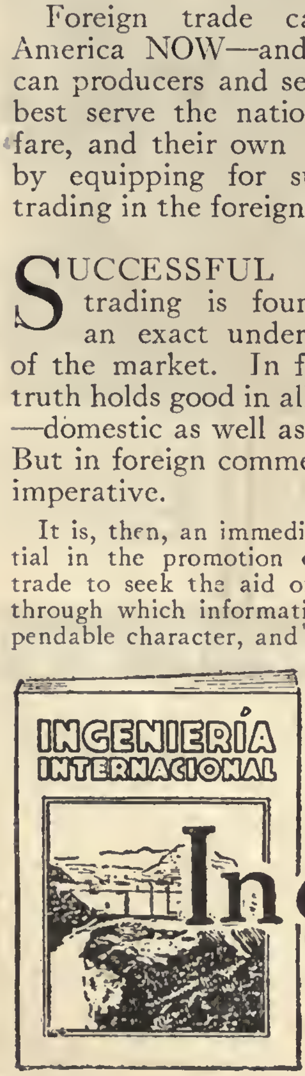
VERNE LEROY HAVENS
Editor of Ingenieria Internacional

FROM January to August of this year, Verne Leroy Havens, editor of INGENIERIA INTERNACIONAL traveled through South America, down the West Coast and up the East, establishing direct contact with the readers of the paper, studying conditions, at first hand, and assuring a continuous contact by establishing a staff of resident editors in all the Latin-American countries.

Basic thinking lies behind the building of INGENIERIA INTERNACIONAL. Never in the history of export publishing has a paper been built on such a foundation.

For more than seventeen years, Mr. Havens was engaged in engineering, financial, commercial and industrial investigation, construction work and in building and operating public utilities in Latin America. With a thorough understanding of economic and industrial conditions in Latin America and Spain, and a comprehensive knowledge of American engineering methods and practice, he and his associates are ideally fitted to direct the policies of INGENIERIA INTERNACIONAL.

The counsel and advice of the paper are always at the service of American manufacturers. The letters and diary of Mr. Havens' trip will shortly be issued in book form. While the edition will be limited, interested manufacturers may obtain a copy by writing to our New York office.



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One of the 11 McGraw-Hill Publications

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The weakest points in most fuses are at the ends of the fibre tube where threads have been cut to hold the ferrules. It is there that ordinary fuses usually give way under the pressure of severe blowouts.

These weak points in ordinary fuses are the *strongest* points in "Union" Fuses because of their different construction. Instead of screwing ferrules *inside* the fibre tube, they are screwed on the *outside* of "Union" Renewable Fuses. Thus, "Union" Fuses are *reinforced* with heavy brass bands at these points.

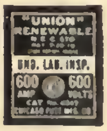
And instead of depending upon the threads alone to hold the ferrules on the tube, they are both riveted and screwed onto the tube in

"UNION"

RENEWABLE FUSES

We are the *pioneers* in the manufacture of fuses having the brass ferrules *permanently* attached to the fibre tubing in the knife-blade types—the first to see the big advantage of metal to metal cap and base.

Throughout, "Union" Renewable Fuses are of the most rugged construction. Every part is heavy enough and strong enough to insure effective, *lasting* service. This explains why they withstand a greater number of blowouts than any other fuse. It explains why "Union" are the cheapest renewable fuses in the long run.



"Union" Fuses, both Renewable and Non-Renewable, are for sale by all leading electrical jobbers and dealers. They are approved in the very highest degree by the National Board of Fire Underwriters.

Free descriptive booklet on request

CHICAGO FUSE MFG. CO.

Oldest and largest manufacturers of Fuses, Electrical Protecting Materials and Conduit Fittings

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Find the Solution

280 pages
of track
data

This handbook of valuable information on track construction and maintenance will help you solve many of those tough problems which come up in every office and drafting room. Useful data and tables, some taken from standard works, much of it original, cover a wide range of track problems. Layout of frogs, crossings, switches, turnouts, etc., are shown complete.

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Yours for the asking; a 5 x 7 inch cloth bound catalogue and handbook, with over 200 designs, diagrams, and illustrations.

St. Louis Frog & Switch Co.

St. Louis, Mo.

Why Were Rails in Paved to 60 ft.

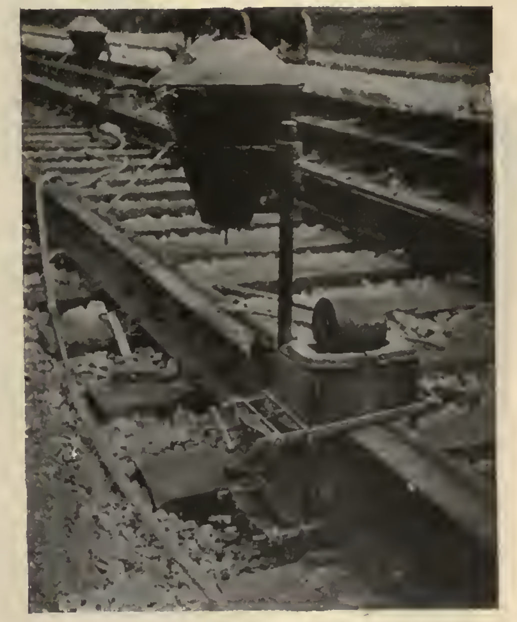
Simply in order to eliminate *half the joints* and therefore to eliminate *half the rail maintenance* caused by defective joints.

WHILE there are many so-called systems of welding, the fact remains that the *Thermit Insert Process is the only practical one which absolutely eliminates the joint.* The other systems only partially solve the problem, as in most cases they simply weld fish plates or splice bars to the rails. These systems have many objections, the principal one being that the heads of the rails are not continuous and the elastic curve in the top fibres of the head cannot be transferred across the gap between the rail ends, with the result that the joint eventually cups.

* * *

Thermit Welding Saves Rerouting Costs

Aside from the mechanical and electrical advantages obtained from a welded rail joint, there are other advantages which should not be overlooked. Chief among these we might mention the cost to the company as a whole due to the rerouting of cars when streets are closed to traffic for joint repairs. In fact, if interdepartmental accounting and overhead charges were properly distributed, the results would show some startling facts. How many, for instance, realize that the true cost of a rail joint is not the labor and material charge paid by the way department, but is the cost paid by the company as a whole, and in figuring the cost of a joint, how many take into consideration that the life of the rail is absolutely the life of the joint and make an amortization charge accordingly? If such items are considered, it would be found that with due allowance for depreciation and maintenance the Thermit welded rail joint would show by far the lowest cost.


Preheating the Rails.
Can of additions placed over mold.

Adjusting Insert Between Rail Heads

METAL & THERMIT CORPORATION

Track Increased from 30 ft. in Length

But why stop at only half the joints when the use of THERMIT INSERT WELDING eliminates *all* the joints?

Making the Weld by Pouring Thermit Steel Into the Mold

Electrically 100% Efficient

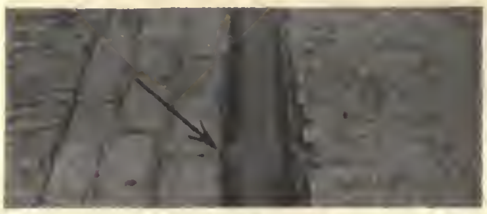
From an electrical standpoint alone the Thermit rail weld offers advantages which cannot be ignored. Failure to conduct all the electricity through the rails to the power house means more than a loss of energy; it means electrolysis and interference with nearby low voltage circuits. To supplement a mechanical joint with an electrical joint, be it of solid copper, ribbon copper or strand copper, would seem to be a comparatively simple matter: but the difficulty is to secure a bond between the copper and the rail that no insulating film of air or oxide will tend to deflect the flow of the return current. Compressed and pin terminal bonds will work loose or the metal will become brittle under vibration. Soldered bonds call for the highest skill in application and yet are very liable to oxidation. Compressed bonds are subject to vibration, corrosion, electrolytic action and theft. None of these bonds maintains its original efficiency indefinitely. On the other hand, the Thermit insert rail weld continues efficient for years of service because it is simply a continuation of the running rail itself without plugs, pins, solder, amalgam or other outside conductors. The full section weld that makes it a perfect mechanical joint also makes it 100 per cent efficient electrically.

Breakage of Thermit Welds Practically Nil

A fully welded rail at least as strong as the unwelded portion of the rail can be obtained. From track that has been welded under varying temperatures, in service under heavy traffic conditions, we find that the percentage of breaks is negligible; no more, in fact, than occurs in unwelded track. In San Antonio, Tex., where over forty miles of track have been welded since 1913, the number of broken welds has been less than one out of two thousand joints welded. Records in other cities, such as Pittsburgh, Youngstown, Boston, Milwaukee, Kansas City, Chicago, New York and many others all prove conclusively that in a period of over eight years the number of Thermit Insert welds that break are really too small to be figured in percentages at all.

* * *

Let us send you a Thermit outfit at once, in the use of which one of our engineers will instruct your men. Send for Pamphlet 3932.



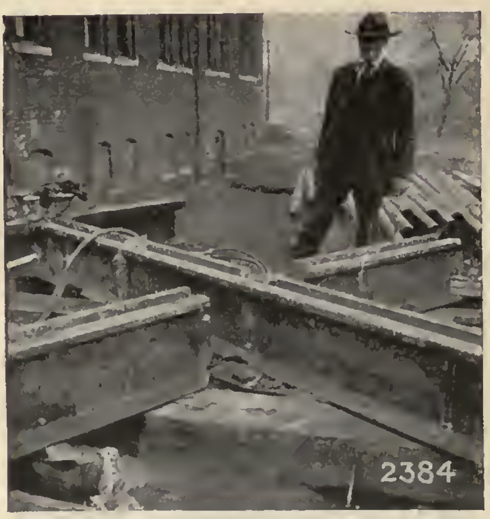
Completed Thermit Insert Weld Installed in the Street

General Offices: **120 Broadway, New York**

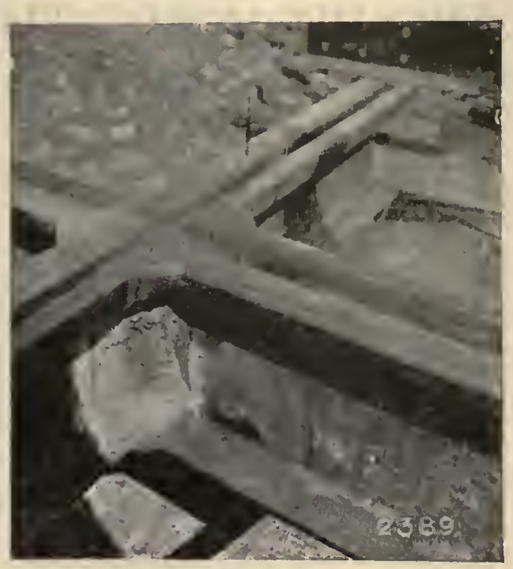
PITTSBURGH CHICAGO BOSTON SAN FRANCISCO TORONTO

As the Welded Joint Is Superior
Thermit Welded Frog

ONE of the most striking developments of Thermit welding during the past year has been the remarkable spread of this process for welding sections of rail to form frogs and single and double track crossings. The advantages of boltless, jointless, Thermit welded tracks are particularly noticeable in the case of special work because Thermit welded frogs can be constructed at only a fraction of the cost of manganese or other special work. Furthermore, service tests of over five years, under heavy traffic conditions, in Milwaukee, Indianapolis, Youngstown and other cities have conclusively shown that Thermit special work has held its own in comparison with other installations costing two or three times as much; in fact it has outlasted manganese insert frogs installed in the same place and subjected to the same service.



Rails Cut to Form Frog Arms



Thermit Welded Frog Machined and Ready to Be Installed

Conveniently Made; Quickly Installed

Thermit welded special work can be made in the railway shops, and the completed layout then transported to the street and quickly set into position and welded to the adjoining rails with minimum delay to traffic. In the case of double track crossings, two halves of the crossing can be constructed in the shops and the projecting arms of each half later welded together in the street.

Metal & Thermit Corporation,

to the Bolted Joint—So Is the Superior to the Bolted Type

Half a Single Track Crossing, Frogs of Which Were Thermit Welded

Advantages Over Solid Manganese Crossings

Thermit Welded Frogs compare favorably with any special work on the market. Their only superior is solid manganese, but when it is considered that at least FOUR and usually more Thermit Welded Frogs can be constructed for the cost of only ONE Solid Manganese Frog, the advantages of the latter completely disappear.

Furthermore,

1. **A solid Manganese Crossing cannot be welded into place; a Thermit Crossing can.**
2. **A solid Manganese Crossing cannot be built up or repaired; a Thermit Crossing can.**
3. **A Solid Manganese Crossing requires special bonding; a Thermit Welded Crossing welded into place requires no bonds at all.**

The outfit required for the work costs only $175 to $200. The necessary material for welding a complete double-track square crossing (i.e., the material consumed in welding operations, such as Thermit, wax, molding material and fuel for preheating, etc.,) will not exceed $325 to $370, depending on the rail used. Labor required for a job of this kind will be approximately 250 man-hours. These figures are conservative and include everything except the value of the pieces of rail used which every street railway has on hand in abundance.

Outfit Useful for Other Welding Purposes

Everything considered, no street railway can afford to be without one of these useful and inexpensive welding equipments, or deny itself the advantages to be derived from making up its own special work, welding arms to broken mates, welding compromise joints when needed and for repairing broken car truck frames, electric motor cases and for other useful purposes too numerous to be mentioned.

Just think this over. Remember, these crossings are not experimental: the first ones which were made over five years ago are still in good condition and giving the most satisfactory service.

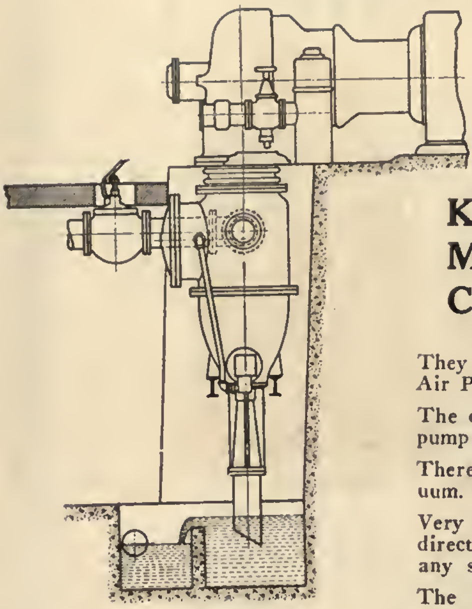
Send for Pamphlet 1232

Two Halves of a Double-Track Crossing Constructed by Welding Frogs in Railway Shops

General Offices: 120 Broadway, New York
Pittsburgh Chicago Boston San Francisco Toronto

THERMIT

Settling the Cond



For assured high vacuum at all loads with the minimum in attention and upkeep your railway plant should be equipped with

KOERTING MULTI-JET CONDENSERS

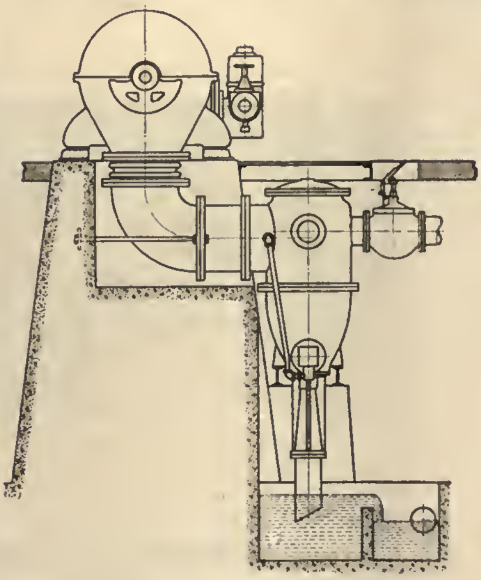
They operate continuously without an Air Pump.

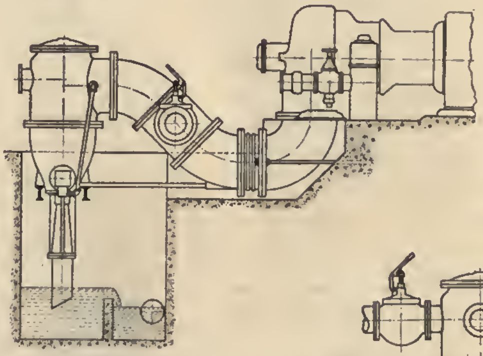
The only moving part is the circulating pump to lift the injecting water.

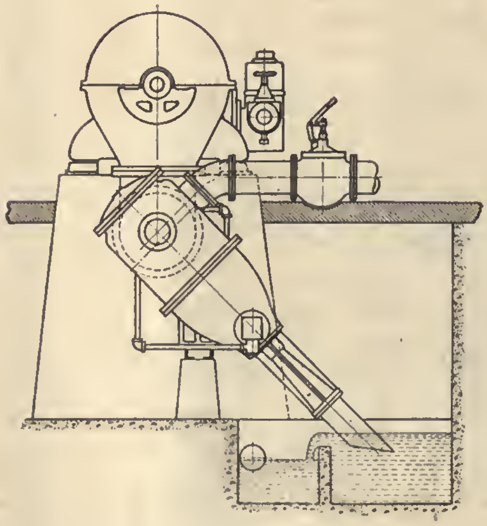
There are no stuffing boxes under vacuum.

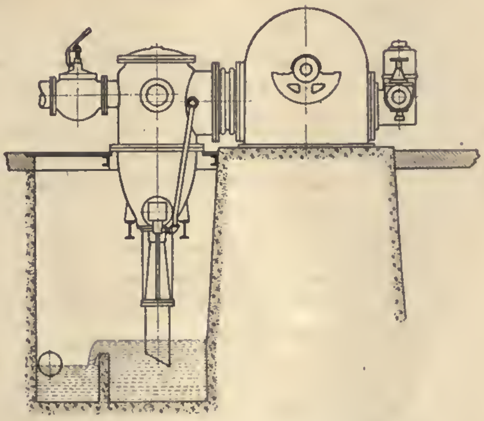
Very compact in space and applicable to direct connection to the turbines through any suitable expansion joint.

The illustrations show a few typical methods of installation.









Interesting particulars are contained in Bulletin No. 5AB. Consultation with our engineering staff would prove very helpful in solving your specific problem.

VALVES
INJECTORS
CONDENSERS
SPRAY NOZZLES
CHEMICAL EQUIPMENT

SCHUTTE & KOERTING

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OIL BURNING EQUIPMENT
EVAPORATORS
DISTILLERS
OIL COOLERS
FEED WATER HEATERS

enser Problem

For districts where sufficient natural supply of condenser cooling water is not available—the benefit of a steadily maintained high vacuum becomes available at a small additional operating cost by means of a cooling pond which is equipped with

KOERTING

Low-Pressure Multi Spray Nozzles

They operate at very high efficiency due to the cooling effect secured by the complete atomization of the water and its perfect mixture with the air. The atomization is intensified by the subsequent collision of two sprays from two concentric nozzles.

The large nozzle areas do not become clogged, and insure high cooling efficiency.

Cost less to install and to operate than cooling towers. Repair costs are extremely small.

Write for Catalog No. 6-B.

VALVES
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OIL BURNING EQUIPMENT
EVAPORATORS
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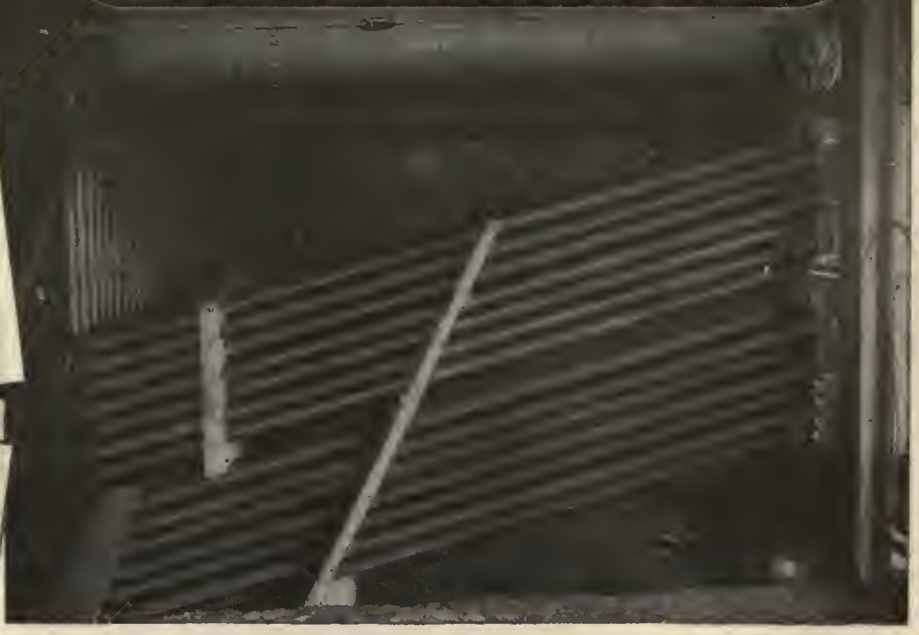
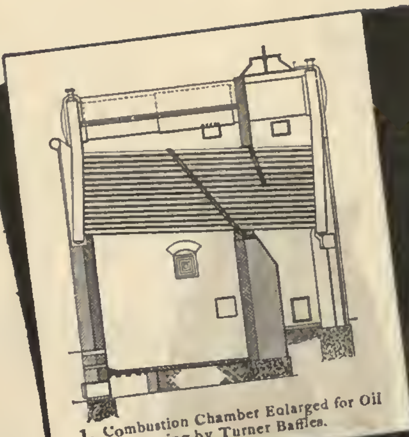
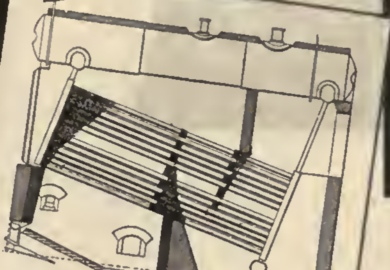
FEED WATER HEATERS

Turner Baffle Walls

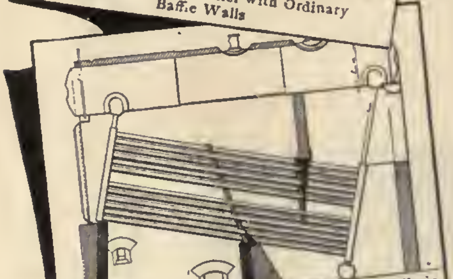




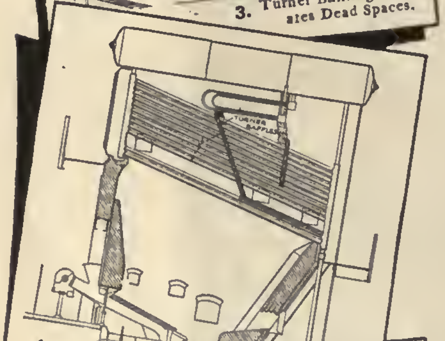
1. Combustion Chamber Enlarged for Oil Burning by Turner Baffles.



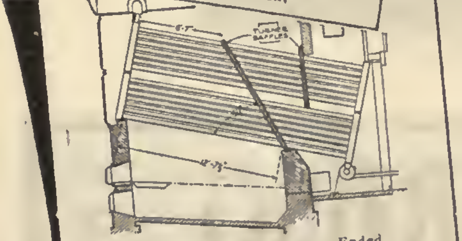
2. Dead Spaces in Boiler with Ordinary Baffle Walls



3. Turner Baffling Eliminates Dead Spaces.



4. Boiler in which Turner Inclined Baffles Reduced Slag Formation.



5. Soot and Cinder Nuisance Ended. Steaming Capacity Increased.

Ending the Troubles of Water Tube Boilers

THE outstanding feature among the advantages of Turner Baffle Walls is that they can be built tight to stay tight *at any angle.* This has made possible the correct engineering solution of many combustion problems which could not be solved by any other means. For example:

ENLARGING COMBUSTION CHAMBER FOR OIL BURNING. This necessary change (figure one) was effected by first lowering the furnace bottom as far as possible, then carrying back the bridge wall and installing Inclined Turner Baffles.

The enlarged furnace chamber permitted complete combustion before the gases reached the tubes thus preventing the destructive action of gases burning in the tube space. 100 tubes had been lost in four months in one boiler; in a year since the change not a tube has been lost.

INCREASING HEATING SURFACES: Turner Baffles permit tapering the pass to whatever degree is correct to meet the design requirements of any boiler setting. Figure two shows the dead spaces not reached by the hot gases in a boiler setting equipped with ordinary baffles. Figure three shows how the correctly tapered pass, made possible by inclined Turner Baffles, subjected practically the entire tube surface to the heat. The correction also relieved a serious restriction through the second pass.

REDUCING SLAG FORMATION. A flying, fusible ash, thrown off by certain grades of soft coal, often sticks to the lower tubes in the first pass. A restriction of the space tends to cause positive pressure in the fire, reducing combustion efficiency and often causing permanent injury to the stoker.

The Turner Inclined Baffle provided a larger entrance to the first pass, thus reducing the gas velocity. Consequently less fusible ash is drawn into the pass, the tubes absorb more heat by radiation, lowering the furnace temperature, less ash adheres to them, and the greater area permits running longer before restriction becomes dangerous.

ELIMINATING THE SOOT AND CINDER NUISANCE. In this boiler, (figure five) Turner Baffles not only increased steaming capacity to a marked degree, but eliminated previous difficulties from soot and cinders by causing them to roll down the back face of the front baffle into a soot pocket. They can then be easily removed with the boiler steaming at full capacity.

These few instances are characteristic of the many combustion faults corrected by the adaptability of Turner Baffle Walls. Other difficulties and objectionable features which have been overcome are High Stack Temperatures, Incorrect Drafts, Reflected Heat.

In our booklet, "The Development of an Idea," you may find the solution to your own boiler problems. *Write for it today.*

The Engineer Company

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Produced exclusively by The Engineer Company

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Decreased Power Generating Cost

Dependable condenser equipment is absolutely essential to economy and represents a highly profitable investment.

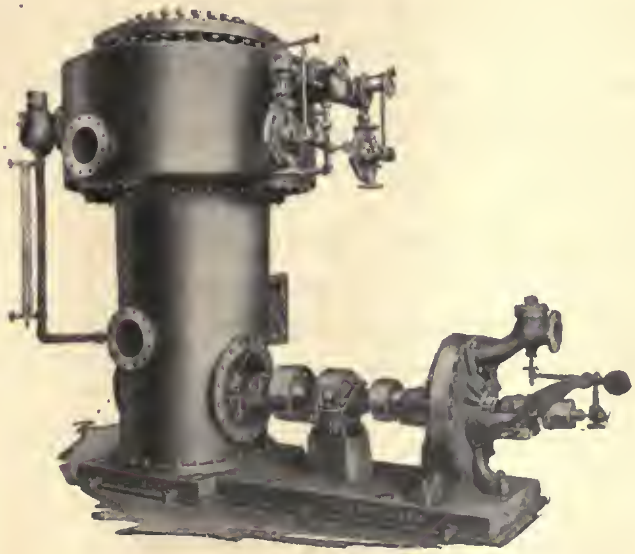
Turbines that are operated with C. H. Wheeler Condensers equipped with RADOJET EJECTOR AIR PUMPS have the advantage in delivering current to the bus bars at a lower cost.

Absolutely dependable due to the extreme simplicity, absence of moving parts and high quality construction.

Very compact in size and high in capacity. Very light in weight. Needs no foundation.

Consult us on your condenser problem, regardless of size of your plant or units.

Radojet Air Pump



C. H. Wheeler Low Level Jet Condenser showing RADOJET EJECTOR AIR PUMPS and Turbo Gear Driven Removal Pumps.

C. H. Wheeler Manufacturing Co.
Philadelphia, Pa.

New York, Boston, Chicago, Pittsburgh, Cleveland, Charlotte, New Orleans, San Francisco and Seattle.

Collier Service

Co-operation with the Advertiser is also Co-operation with You

There are a dozen ways to skimp on the quality car-card publicity if we wanted to skimp—as in design, grade of paper and ink, frequency of change, timeliness of subject advertised, merchandise data, so on.

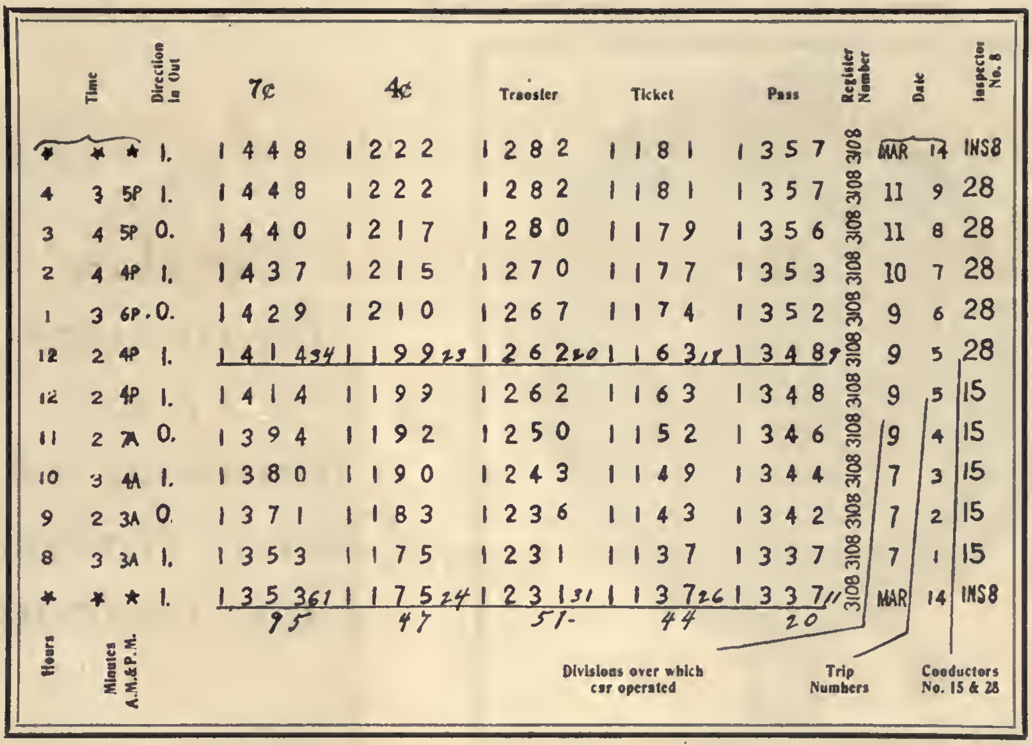
But the fact that Collier Service cars are notable for the large proportion of experienced national advertisers proves that these advertisers realize that they are getting real co-operation in selling their product.

Because of this co-operation their confidence in car-card advertising has remained undiminished despite the enormous development of other forms of advertising since Collier Service was originated.

That is where our co-operation with *you* comes in—for it is the advertiser's confidence in Collier Service that keeps car-card advertising a source of permanent revenue to the electric railway.

Barron G. Collier
INCORPORATED
Candler Building, New York

The Ohmer System



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The Ohmer System of fare protection gives you audible, visible, classified registrations and clean-cut detailed printed records. These things are essential unless you are willing to violate the principles of good business in the important matter of protecting your income.

The Ohmer System is quick and accurate, both as to fare collecting and fare accounting. It is adapted to all kinds of service. Through its fairness and businesslike simplicity it appeals to the best class of conductors and through the operation of the quickly compiled Ohmer System statistics, you are enabled to secure increasingly better standards of service from your men.

The Ohmer System can be applied to your property without tying up any of your capital. We bear the investment burden. Our contracts are sufficiently flexible to take care of changing conditions, increased fare rates, etc., and you need never fear being caught with a lot of obsolete devices on your hands.

Ohmer Fare Register Company
Dayton, Ohio

International
Fare Registers

Type R-5,
Double Register.

The Standard Equipment of a Majority of Electric Railway City Systems

Nearly a quarter of a century of service has established International Registers as standard wherever fare registers are used. Accurate records of passengers and fares, essential to the administration of an electric railway or city system, are assured with International equipment.

Odd-cent fares, or frequent changes of rates impose no difficulties in the use of International Registers. No matter what the change in fare, the collection system is still complete and entirely effective, without changes or adjustments. Fare registers, operated by the conductor and counting passengers instead of money, provide a flexible system for positively checking the load and the receipts.

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Manufacturers of Fare Registers and Railway Supplies, and General Selling Agents for
HEEREN ENAMEL BADGES
Office and Factory: 15 So. Throop Street, Chicago, Illinois

SAMSON
Spot Trolley Cord

is the best obtainable for your Safeties and heavies because it is the most durable and will give the longest wear. It is waterproofed—non-swelling and smooth. It is the ideal cord for all operating conditions.

Look for the colored spot!

because Samson Spot Cord is the only cord so marked. It is truly the mark of the real low maintenance trolley cord.

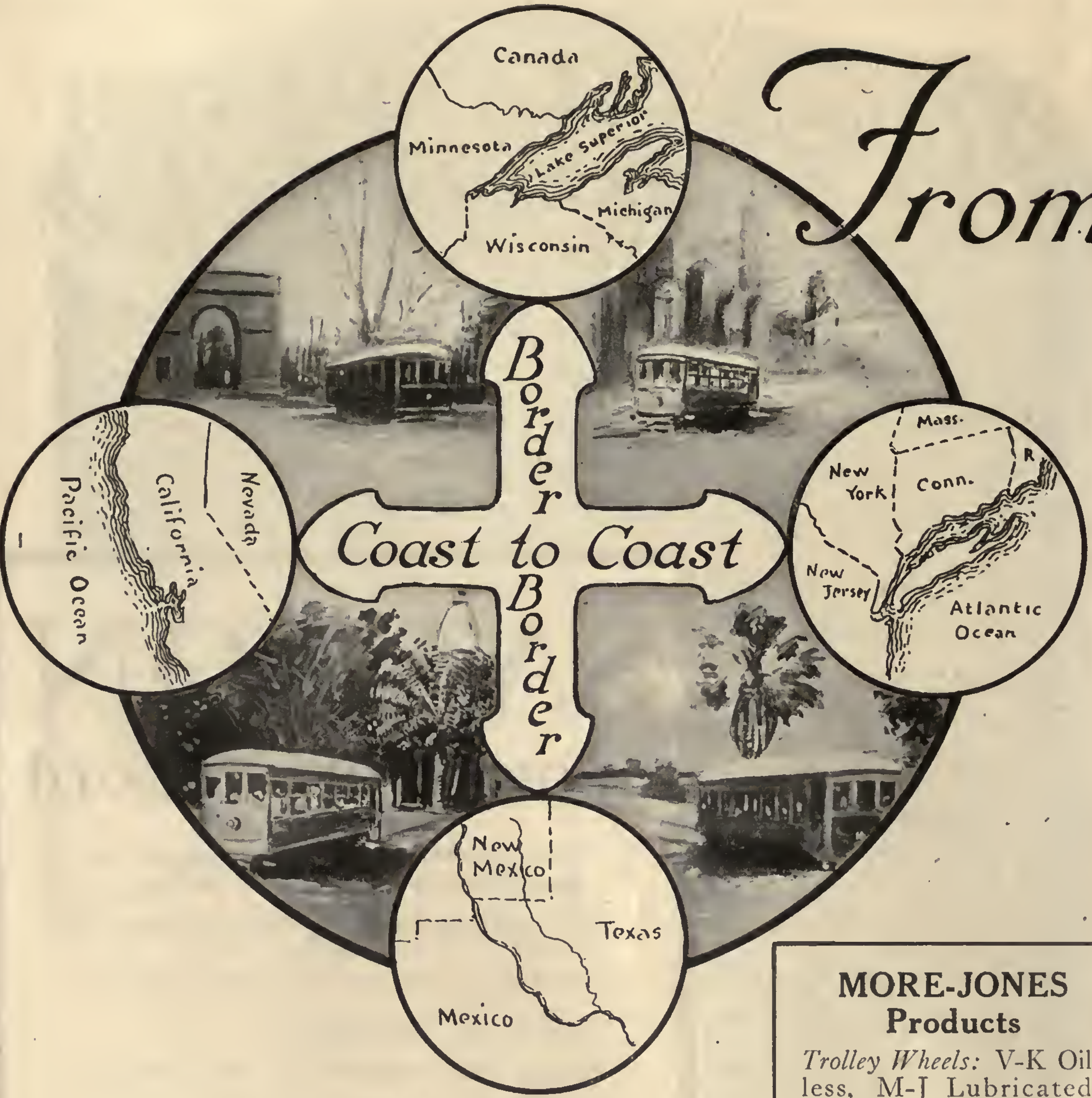
Samson Register and Signal Cords

defy sharp cord supports and the rough treatment of platform men. Solid braided cotton, same extra quality as Samson Spot Trolley Cord. Drab, mahogany and white colors—all sizes—with or without wire center.

Let us send you catalog and samples.

Samson Cordage Works
Boston, Mass.

From



MORE-JONES
Products

Trolley Wheels: V-K Oilless, M-J Lubricated, V-K Non-Arcing Harps.

Bearings: "Tiger" Bronze Axle and Armature Bearings. Armature Babbitt and similar products.

More-Jones

Coast to Coast and Border to Border

Every More-Jones product is designed and constructed to increase the profits of railways through the reduction of operating and maintenance costs.

In every part of the country—from coast to coast and from border to border—you'll find Electric Railways that have standardized on More-Jones Equipment. The executives of these roads know from experience that true economy is governed, not solely by purchase price, but by sustained low cost of operation.

If you are interested in securing maximum results from your trolley wheels and harps, axle and armature bearings, babbitt metals, etc., write for a copy of the More-Jones catalog. It describes the complete M-J Quality Line in detail and explains why economical operation invariably follows their use.

MORE-JONES BRASS & METAL CO.
St. Louis, Mo.

Quality Products

USG for Uniformity
USG Co's Mexican Graphite Products
Est. 1891

Simply specify the Grade number you want—and that grade of

U. S. G. Brushes

will be supplied you in the same identical quality on all future orders.

We own and operate our own Mexican Graphite Mines. Let us submit you figures.

The United States Graphite Co.
Saginaw, Michigan, U. S. A.

Branch Offices:
New York Philadelphia Pittsburgh Birmingham
Chicago St. Louis Denver San Francisco

Largest Miners of Graphite on this Continent

Caught in the Act

No damage—only a loose steady span

This Is the Reason Why

EARLL

Catchers and Retrievers

on safety cars, city cars and on high speed interurban cars are so popular with train men and executives. No excuses and no delays. If a rope breaks it can be fixed in a jiffy.

FOR SAFETY CARS use the Earll No. 10 Catcher, or No. 4-A-S Retriever, specially designed for City Service—there are sound reasons for using light Retrievers on Safety Cars.

FOR ORDINARY CITY OR SUBURBAN CARS use the Earll No. 7 or 10 Catcher, or the No. 4-A-S Retriever.

FOR HIGH SPEED INTERURBAN CARS use Earll No. 4-A-L or No. 5-A-L Retrievers.

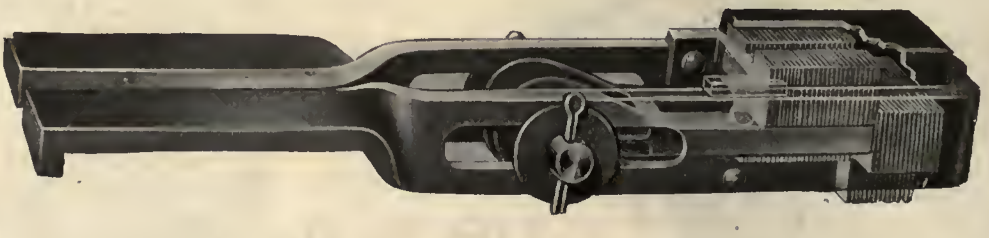
Simplicity of design enables us to produce the lightest Catchers and Retrievers with the fewest and most rugged parts—and, besides, there are the Ratchet Wind, the Emergency Release, the Drum Check, the Free Winding Tension Spring and a number of other valuable features peculiar to the Earll Catchers and Retrievers.

C. I. EARLL
York, Pa.

Irrefutable Arguments

for the immediate installation of

SMITH-WARD BRAKE SLACK ADJUSTERS



Your Problem	*The Answer*
High Cost of Labor—	You need less car house and inspection employees because—*the adjustment of the brake is automatic throughout the life of the brake shoe.*
High Cost of Safety—	The Smith-Ward Adjuster gets rid or human adjustment with attendant danger due to improper setting of shoes. It sets itself correctly, night and day, winter and summer. And the motorman finds the brakes doing exactly what he wants.
High Cost of Replacement—	Even brake shoe wear means longer life. Also air pressure is not wasted—another economy—because the shoe is correct distance from wheel. Less jar to car structure and steam on brake rigging, too.
High Cost of Mileage—	Reduced by increase of schedule speed through high rates of braking—it's safe with the Smith-Ward.

Smith-Ward Brake Company, Inc.

Bush Terminal Bldg. No. 1

233 Thirty-seventh Street, Brooklyn, N. Y.

A Low Whisper At High Speeds

The modern electric locomotive weighs 275 tons and the safety car only eight tons.

These two types of rolling stock represent the extremes in weight and power to which electric railways have gone to obtain the highest efficiencies.

Nuttall silent helical gears are used on the latest types of both these extremes as well as on all intermediate types and the success which helical gears have met proves their worth.

Some of the reasons for their success are:

1. Quiet operation.
2. Absence of vibration.
3. Increased life.
4. Reduction in maintenance cost.

A low whisper at high speeds is the only sound that Nuttall Helical gearing makes.

Nuttall

REPRESENTED IN THE UNITED STATES BY WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY DISTRICT OFFICES

R.D.NUTTALL COMPANY
PITTSBURGH PENNSYLVANIA

Carload after Carload

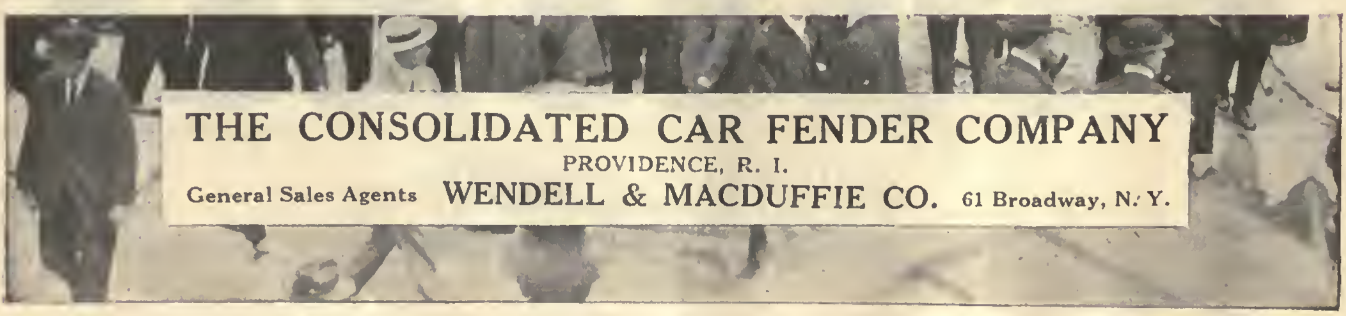
Carload after carload of safeties are leaving the car builders' shops and in practically every case they're H-B Life Guard equipped.

Accident Situation Improves

The trend of accidents, according to the latest census figures, shows that during 1907, 3,086,919 passengers were carried on street cars per one person killed, while in 1917 the number of passengers carried per person killed was 4,393,572. Expressed in percentage, the electric railway hazard decreased approximately 33 per cent. during 1917 as compared to 1907.

Now, is it any wonder that carload after carload of safeties are leaving the car builders' shop H-B equipped?

H-B Life Guard, the last word in making the safety car safer.



THE CONSOLIDATED CAR FENDER COMPANY
PROVIDENCE, R. I.
General Sales Agents WENDELL & MACDUFFIE CO. 61 Broadway, N. Y.

To Railway Operators

CARNEGIE STEEL COMPANY manufactures for railway use the most complete line of steel sections made in the United States: rails, cross-ties, bridge material, steel sheet piling, wheels, axles, gear blanks, car materials, tool steels, slag — in fact, anything and everything within their limits the car-builder, mechanic, or engineer of maintenance of way needs. Furthermore, its trained engineers are ever ready to serve railway executives in the solution of any problem of construction, maintenance or equipment in which wide experience in manufacture can be of assistance. Some lines in which this experience may be of particular value are:

Axles: Heavy loads on electric railway service have called for a forged axle of maximum strength and durability. Carnegie Steel Company makes electric railway axles standard forged, annealed, or quenched-and-tempered. More than fifty years ago these were considered the best obtainable. They are still the standard of excellence.

Wheels: Carnegie wheels are made to withstand the most severe service. Improvements have been made in machinery and processes of manufacture to assure the utmost in service.

Cross-Ties: Steel cross-ties are the recognized standard for permanent track construction. A trial will demonstrate their economy. The illustrations above show steel cross-ties being installed on Euclid Avenue, Cleveland, Ohio.

Gear Blanks: The use of gears cut from Carnegie Steel Gear Blanks is a guarantee of maximum service and minimum repairs and installations of new gears.

Tool Steels: After careful experimentation Carnegie Steel Company offers the railways electric carbon tool steels carefully made in five grades, to meet all ordinary uses. In very many cases they will render service equally as good as higher priced alloy steels.

Slag: For use in any type of concrete construction, or as ballast for roadbed, Blast Furnace Slag is the lightest and strongest coarse aggregate commercially available, and, added to this, within haulage radius from furnaces, it is the most economical.

For literature on any one of these specialties write any district office.

Carnegie Steel Company

General Offices: Carnegie Building, Pittsburgh, Pa.

1350

Safety Cars

Weight 50 lbs.

For W. H. 508 Motor used on One-Man Safety Car Equipment.

Strength and quality are not sacrificed for size. The construction is of the same high standard as that of the larger cases.

By the Hundreds are being Equipped with CHILLINGWORTH GEAR CASES

because of their lightness and durability.

Low service cost is made possible because of the light weight, strong construction, interchangeability and the absence of seams and rivets.

Chillingworth Brackets are specially designed for every type of suspension.

Each support (made of malleable iron casting rivetted to the case including the inside reinforcing plate) is provided with a side overlapping wing, to prevent "weaving" of the rivets, due to any side motion of the trucks, and to withstand the usual vibration of street railway service.

Chillingworth Manufacturing Company

Jersey City, N. J.

Sales Department: Thayer and Company, Inc., 111 Broadway

Kalamazoo
trolley wheels and harps

KALAMAZOO Equipment has fully demonstrated the economy of quality. Long life under the hardest of service, even with conditions of wear more severe than could possibly be anticipated, has been proved by 20 years of performance on leading roads.

Kalamazoo Harps give perfect and continuous contact, and are designed to permit easy replacement of wheels. There is only one cotter pin to be taken out to remove the wheel.

Kalamazoo wheels are made of virgin metal—pure lake copper—they are of proper design for the intended service, and are honestly manufactured.

They are balanced for easy running and freedom from slippage. They do not wear down and damage the wire, for wire life is more important than wheel life.

Catalogue is a valuable handbook.
Sent on request.

STAR BRASS WORKS
Kalamazoo, Michigan
The largest exclusive manufacturers of trolley wheels in the world

Have You BOYERIZED That Brake Rigging Yet?

Here are some of the many who know that it's far more economical to pay a little more for the longer-lived Boyerized brake pins and bushings than to have to pay for the extra labor hours and loss of car earning time that go into the replacement of the supposedly cheaper kind.

In New England

Eastern Massachusetts Railway—The Connecticut Company—Springfield — Worcester — New Bedford, etc.

In the Middle States

Public Service Railway — Third Avenue Railway of New York—Most everywhere in Pennsylvania and New Jersey — Baltimore — Washington—etc.

In the Central States and West

Columbus — Cleveland — Toledo —Indianapolis — Terre Haute — Fort Wayne—Illinois Traction System, Little Rock, etc.

In the South and Southwest

New Orleans—Savannah, Jacksonville—Tampa—Key West—Pensacola—Galveston—San Antonio—Fort Worth, Etc.

On the Pacific Coast

Page Frank F. Bodler of San Francisco, etc.

Get that "etc.?" It means there are so many Boyerized roads, we haven't space for 'em all. So you're sure of lots of good company no matter where you are!

Lots of 'em using Boyerized Manganese Brake Heads, too!

Other Boyerized Specialties are:

Boyerized Brake Lever Pins and Bushings.

Boyerized Wearing Plates between the Pedestal Straps and the Journal Box.

Boyerized Brake Hangers.

Boyerized Wearing Plates between the Bolster and Bolster Carrier.

Bemis Car Truck Company

Electric Railway Supplies

Springfield, Mass.

Baksheesh

Professional mourners are employed in Egypt, who howl for the grief of the whole family. Their contracts call for continuous howling until the body is lowered into its grave. Then they receive their baksheesh, or pay, and immediately beat it for the next crepe-hung door post.

That's the way things are done in the Land of the Nile. Ten cents' worth of medical attention and ten dollars' worth of howling after the well-known bucket is kicked!

How like the central station operator who gives up good hard jack to the vendors of cheap carbon brushes and then wonders why his commutators give him forty different brands of trouble capped with a raspberry.

Every day, however, more operators are arriving at the truth. The whole field is slowly coming to the realization that the Morganite way is the *only* way —that conditions *wholly* govern the type of brush to be used. And that the Morganite prescribers are best fitted by experience to find the trouble and select the brush to correct it.

Prove it to yourself at our risk.

Morganite Brush Co., Inc.

MEMBER AMERICAN ELECTRIC RAILWAY ASSOCIATION AERA 1921

Main Office and Factory: 519 West 38th Street, New York

DISTRICT ENGINEERS AND AGENTS:

Electric Power Equipment Corp.,
13th and Wood Sts., Philadelphia

Electrical Engineering & Mfg. Co.
First National Bank Bldg., Pittsburgh

R. W. Lillie Corporation
176 Federal St., Boston, Mass.

W. R. Hendey Co., Hoge Bldg., Seattle

Herzog Electric & Engineering Co., 150 Steuart St.,
San Francisco

Charles Farnham, I. W. Hellman Bldg.,
Los Angeles

Railway & Power Engineering Corporation, Ltd.,
131 Eastern Ave., Toronto, Ontario, Canada

Avoid Traffic Delays and Damage to Overhead—Specify

MILLER TROLLEY SHOES

and watch your trolley troubles vanish

This is absolutely true because never yet has a Miller Trolley Shoe been responsible for a bent or broken pole and the damaged car-roof or torn-down trolley wire which often results therefrom.

The New Miller Trolley Shoe is the ideal Current Collector.

It has no limitations.

It will back up as easily as it will go forward.

It eliminates arcing and noise. It reduces dewirement to a minimum.

It needs no lubricants.

It delivers more power to the motors.

It gives greater mileage. It reduces maintenance cost.

It is standard on many roads.

Write today for details.

Miller Trolley Shoe Co., West Newton, Mass.

SPECIAL REPRESENTATIVE: Holden & White, Inc., Chicago

EASTERN REPRESENTATIVE: National Railway Appliance Co., New York

SALES REPRESENTATIVES:

Alfred Connor
Denver, Colo.

S. I. Wailes,
Los Angeles, Cal.

T. C. White & Co.,
St. Louis, Mo.

W. F. McKenney,
Portland, Oregon

F. F. Bodler,
San Francisco, Cal.

J. L. Whittaker
141 Milk St.
Boston, Mass.

W. M. McClintock,
St. Paul, Minn.

Ball Bearing Journals Make Good in the World's Biggest City

Said A. L. C. Fell, General Manager London County Council Tramways before the Municipal Tramways Conference, Cardiff, Sept. 15-17, 1920, as part of his economy paper on "Operating Costs: Power Expenses."

"In 1912 a series of tests was carried out, when the average current taken for a tractor (motor) car was found to be 1.8 amp. per passenger, and for a tractor and trailer combined 1.22 amp., or a reduction of 32 per cent per passenger due to the employment of the trailer car. The passenger seating capacity of the cars used for this test was tractor 62, and trailer 46, the cars were loaded with sand to approximate fully loaded service conditions.

"It should be noted that the journals of all the trailer cars in London are fitted with radial ball bearings.

"Tests taken on the level showed the tractive effort at the draw-bar to be 17.02 per ton (2240 lb.) of load with these bearings, as against 38.03 lb. per ton (2240 lb.) of load when the journals were fitted with bronze bearings.

"And to this fact the low energy consumption can be partly attributed."

Added C. J. Spencer, Esq., Manager Metropolitan Electric Tramways, in discussion, "If it is good policy to fit a trailer car with ball bearings, is it not equally good policy to fit a motor car with ball bearings?"

The standard electric railway ball bearing of America, whether in motor car or trailer car service, on your journals and on your motors, is the GURNEY. Let us help you to make both your single car and train operation attain the highest possible economy and increase your present schedule speeds.

GURNEY BALL BEARING CO.
Conrad Patent Licensee
JAMESTOWN, N. Y.

GURNEY
BALL BEARINGS

The Ideal Equipment for City or Interurban Cars

Agasote
(Trade Mark)
For Roofing—Headlining—
Wainscoting

Pantasote
(Trade Mark)
For Curtains

Better Service at Lower Cost

The Chicago Surface Lines in specifying Agasote on its new trailers for headlining know the actual SERVICE that this material will give.

On this property, as well as on hundreds of others, there is ample evidence of the superiority of Pantasote curtains and Agasote roofing over all others.

Agasote for roofing will outwear wood many times. It is absolutely waterproof to start with and it stays that way.

In case of accident it is easily and rapidly patched.

Old-fashioned curtains wear out quickly. They are made of flimsy material, easily torn, stained and discolored.

Pantasote Curtains wear a great many times longer; are made tough and not easily torn. When washed they look as good as new.

RESULT

Economy *Light-weight* *Durability*

THE PANTASOTE COMPANY

11 Broadway, N. Y. People's Gas Bldg., Chicago, Ill. 751 Monadnock Bldg., San Francisco, Calif.

Why do they all single out Tool Steel Gears and Pinions?

In the American Association magazine, AERA, December, 1919 and January, 1920, someone put the following question:

E-e-347 **Will you please give your opinion of a good, fair mileage for treated, untreated, hardened and tool steel gears and pinions?**

The following answers were received and printed:

E. C. FOSTER, *President,* Manchester Street Railway Co., Manchester, N. H.—Non treated gears city traffic, 50,000 miles; interurban, 75,000 miles. Making tests on hard steel gears.

R. L. JONES, *Master Mechanic,* Massachusetts Northeastern Street Railway Co., Haverhill, Mass.—I have no absolute correct data on treated and untreated gears. We have some tool gears and pinions that have run 275,000 miles and have shown hardly any wear.

F. H. HARRIS, *Superintendent of Equipment,* Charleston Consolidated Railway and Lighting Co., Charleston, S. C. At present we are using nothing but tool steel gears and pinions, except on some new equipments, but as we have as yet not worn any out, we can not give any definite information on this subject.

H. W. DEININGER, *General Superintendent,* Iowa Southern Utilities Company, Centerville, Iowa.—We get approximately 250,000 miles from untreated pinions, or about four years' daily service on untreated gears. We have some on which we have kept a record, which have run 385,000 miles with very little signs of wear. Will probably reach 500,000 or 600,000 miles.

C. H. NELSON, *Superintendent,* Grays Harbor Railway & Light Co., Aberdeen, Wash. —Indefinite; practically no trouble.

RALPH A. GILL, *Manager's Secretary,* El Paso Electric Railway Co., El Paso, Tex.—For treated tool steel gears, 300,000 miles. Pinions 180,000 miles.

EDWARD A. WEST, *General Superintendent,* The Denver Tramway Co., Denver, Colo. —In Denver service untreated pinions average 40,000 miles; treated average 55,000 miles. *Tool steel pinions running with tool steel gears average* 300,000 *miles.* Tool steel gears for which we have mileage records show 755,661 miles.

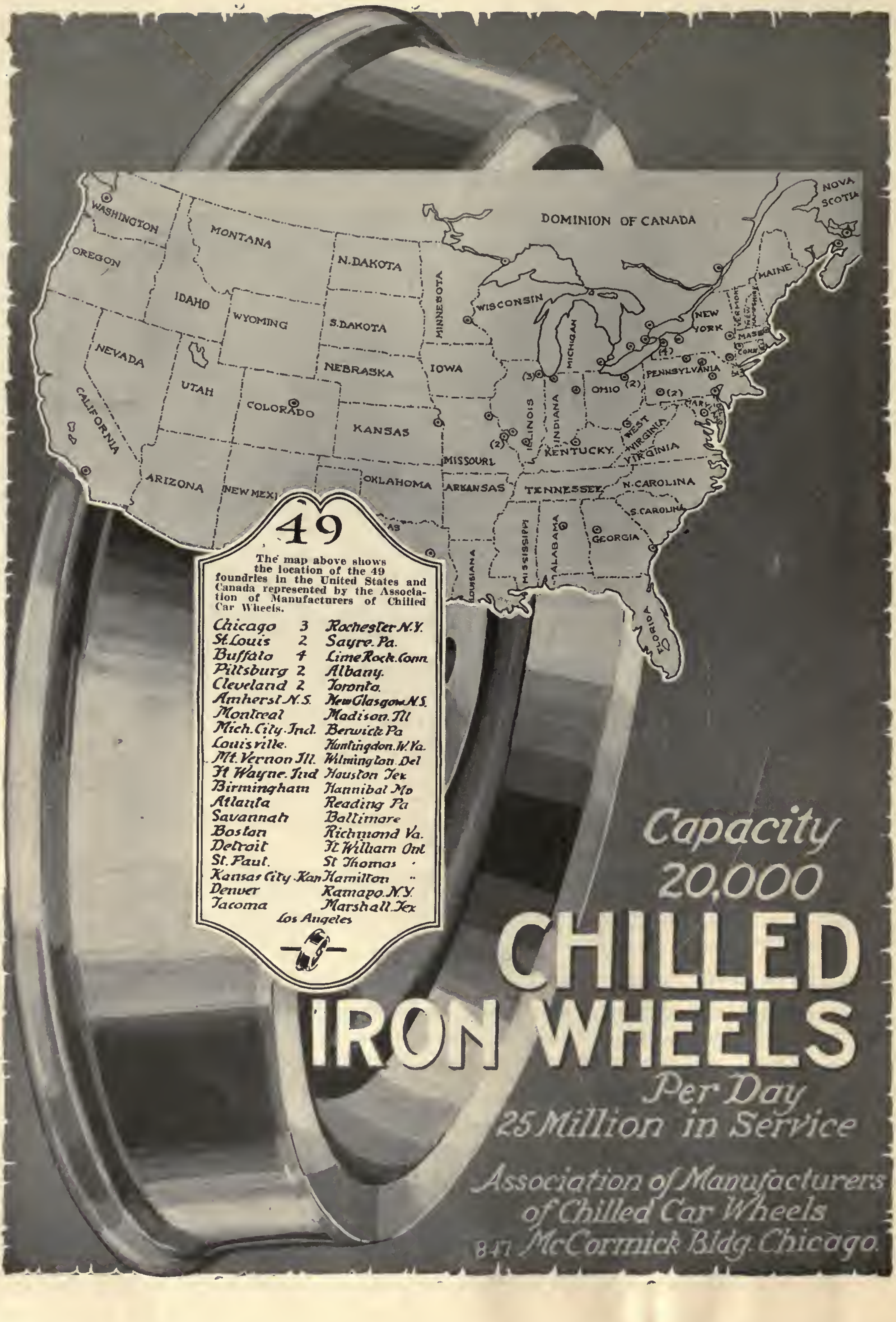
C. C. SLATER, *General Superintendent,* The Columbus Railway, Power & Light Co., Columbus, O.—It is impossible for us to give a fair answer to this question as operating conditions are the determining factors in gear life.

SUMMARY

Six definite answers, of which four companies regularly using Tool Steel gears. (and look at the dandy records they show) one company is testing, one company satisfied with untreated. No one seemed sufficiently enthused about those "just as good as Tool Steel—special quenched gears" to even record their tests.

The "live wires" of the industry who follow tests and use the question box for the experience of others, are almost always "boosters" for Tool Steel gears.

There's a Reason!



49

The map above shows the location of the 49 foundries in the United States and Canada represented by the Association of Manufacturers of Chilled Car Wheels.

Chicago 3
St. Louis 2
Buffalo 4
Pittsburg 2
Cleveland 2
Amherst N.S.
Montreal
Mich. City Ind.
Louisville.
Mt. Vernon Ill.
Ft Wayne. Ind
Birmingham
Atlanta
Savannah
Boston
Detroit
St. Paul.
Kansas City Kan
Denver
Tacoma
Rochester N.Y.
Sayre. Pa.
Lime Rock. Conn
Albany.
Toronto.
New Glasgow N.S.
Madison. Ill
Berwick Pa
Huntingdon. W. Va.
Wilmington. Del
Houston Tex
Hannibal Mo
Reading Pa
Baltimore
Richmond Va.
Ft William Ont
St Thomas "
Hamilton "
Ramapo. N.Y.
Marshall. Tex
Los Angeles

Capacity
20,000
CHILLED
IRON WHEELS
Per Day
25 Million in Service

Association of Manufacturers
of Chilled Car Wheels
847 McCormick Bldg. Chicago.

"STANDARD"

Steel Tires

Steel Tired Wheels

Solid Rolled Steel Wheels

O. H. Steel and Malleable Iron Castings

Solid Forged Geared Blanks

Steel Forgings Iron Forgings

Forged and Rolled Steel

Pipe Flanges

Ring Dies

Rings

Roll Shells Steel Springs

S BRAND *"The 'Standard' Brand on your material is an assurance of eventual economy."* S BRAND

STANDARD STEEL WORKS CO.

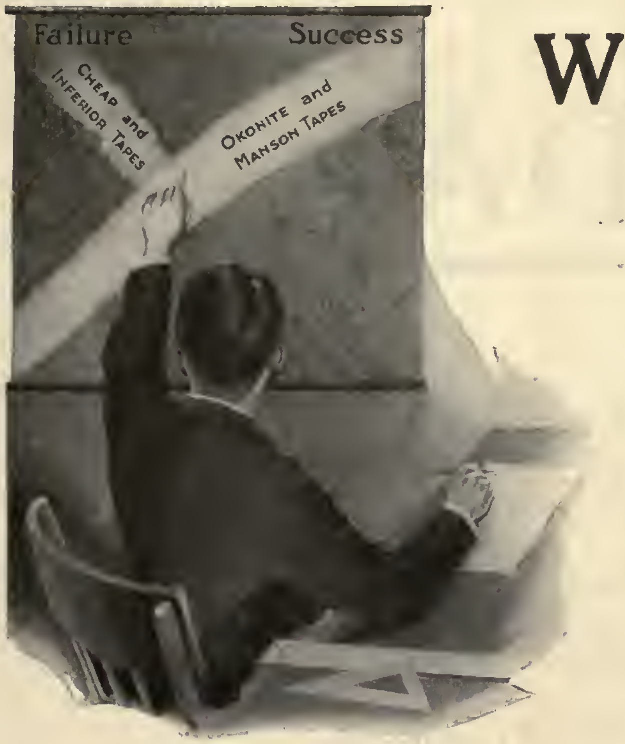
GENERAL OFFICES:

500 NORTH BROAD ST., PHILADELPHIA, PA.

CHICAGO
ST. LOUIS
HAVANA, CUBA
ST. PAUL

RICHMOND
SAN FRANCISCO
NEW YORK
HOUSTON

MONTEREY, MEX.
MEXICO CITY
LONDON, ENGLAND
PARIS, FRANCE



Which Road

Mr. Engineer?

You must make the decision!

Are you courting failure by the use of cheap splicing tapes—tapes that contribute *weakness* instead of *strength* to this small but *vital* part of the distribution system? OR are you insuring Success by the use of Okonite and Manson Tapes?

Low initial cost plus subsequent expenditures for renewals, does not make for either economy or satisfaction.

Splices made by using Okonite Rubber Insulating Tape and Manson Friction Tape will put you on the right road—*and keep you there.*

THE OKONITE COMPANY, PASSAIC, N. J.
Incorporated 1884
CENTRAL ELECTRIC Co., Chicago, Ill., General Western Agents
Pettingell-Andrews Co., Boston, Mass. Novelty Electric Co., Philadelphia, Pa.
F. D. Lawrence Co., Cincinnati, O.

OKONITE
TRADE MARK.

You Can Minimize Overhead Repair Work

and successfully cut maintenance costs if you turn to

The Macallen Line

of strain insulators, hangers, splicing ears, crossings, and other overhead material.

They are "specialty" products, designed and built to make "Macallen" the standard on American railways.

It will pay you to write for information and prices.

The Macallen Insulating Joint

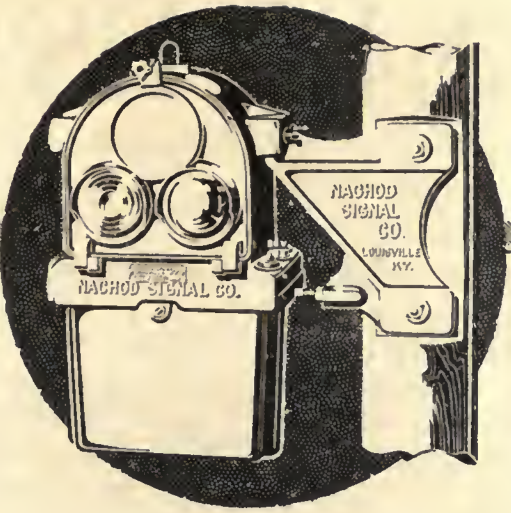
Adopted by principal air brake manufacturers as part of their standard equipment. Also insulates steam pipes, etc. Shell is seamless drawn steel, nipples are machined from steel rod, and insulating material is Macallen Vulcanite Compound, not affected by heat or oil—practically indestructible.

May We Send Our Catalog?

TRADE MACALLEN MARK.

The Macallen Company
Macallen and Foundry Sts., Boston

TRADE MACALLEN MARK.


NACHOD SIGNAL CO. LOUISVILLE KY.
NACHOD SIGNAL CO.

This Road Needed Them; What About Yours?

A two-hundred-mile electric railway in Pennsylvania has come to depend so largely upon Nachod Signals that if they were suddenly removed, service would be prostrated. And yet this company *did* operate without them.

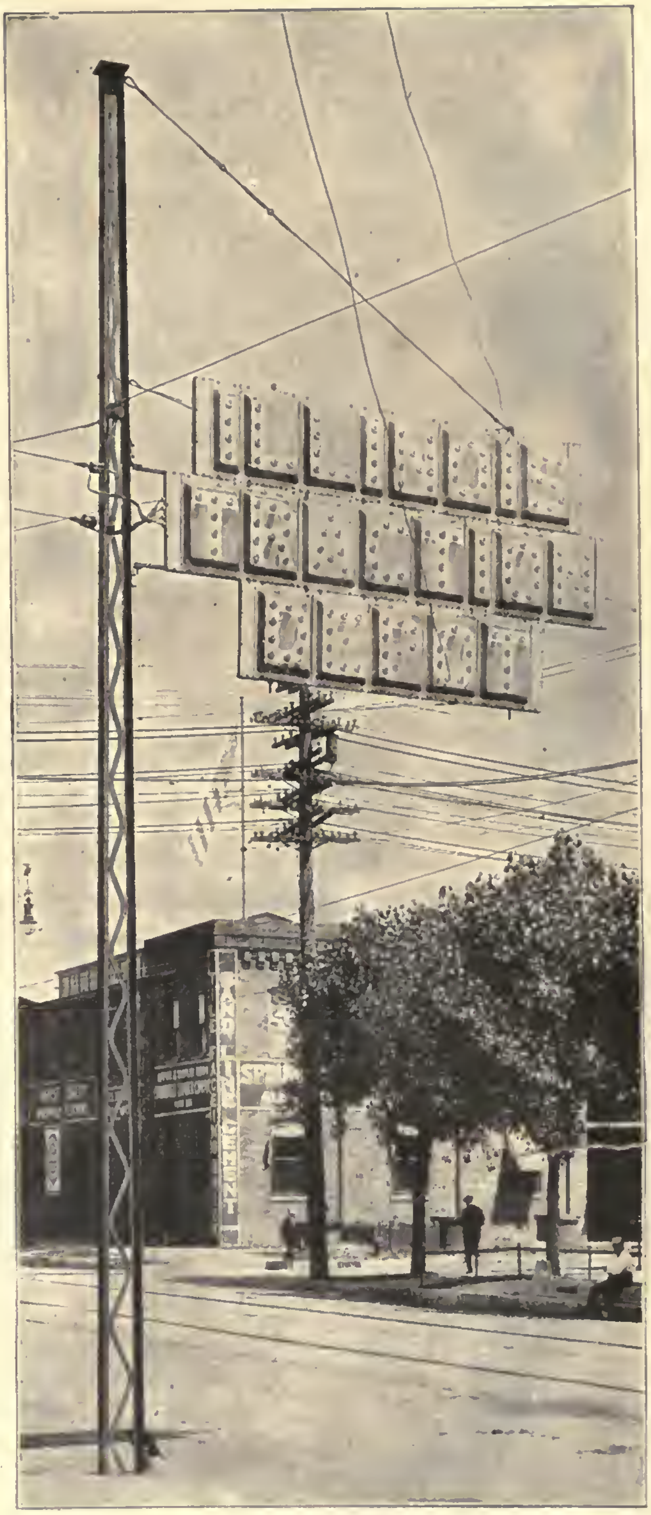
NACHOD SIGNALS

The company referred to has been gradually increasing its equipment of Nachod Signals during the past ten years until it has now obtained complete protection for all single track, with more than one hundred of these signals in use.

The signal maintenance is of a high type and the cost per signal extremely low. It has been found that Nachod Signals are of immense benefit in increasing traffic, preventing needless delays, checking the dispatcher's work and contributing in many ways to safe operation. Of one block on a single-track bridge it was said: "If those signals were removed there would be a strike."

If your road is not receiving the benefits of Nachod Signals, we will gladly tell you more about them. Ask for Catalogue 719. Nachod Signal Co., Inc., Louisville, Ky. Manufacturers of Automatic Signals, Highway Crossing Bells and Automatic Headway Recorders.

NACHOD *spells* SAFETY



Bates One-piece Poles Are Artistic

Perhaps Art is a secondary consideration when you plan your pole line construction, but it cannot be disregarded—especially when these poles are to be installed in exclusive residential districts or on your business blocks.

The combination of great utility and art with the lowest first cost makes the Bates Poles desirable for all types of pole line construction.

Our New 1921 TREATISE AND HANDBOOK sent upon request.

Bates Expanded Steel Truss Co.

208 South La Salle Street
CHICAGO, ILLINOIS

Speed and Safety

will result from the constant use of Bayonet Equipment. Renewals made instantly.

Bayonet Special Trolley Wheels

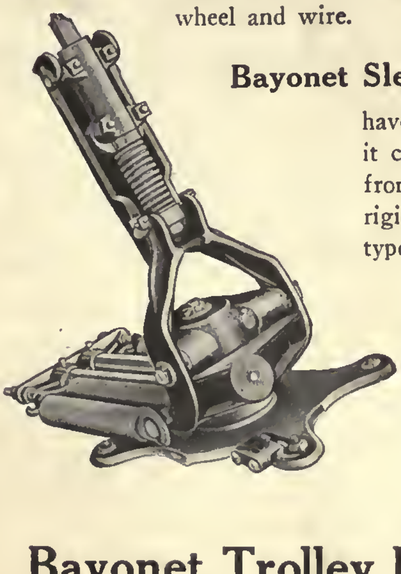
are made from the highest grade metal and are hand turned, insuring greatest accuracy and balance. Reputation was gained by competitive tests.

Bayonet Detachable Trolley Harps

are the only trolley harps with which you can change from wheel to sleet cutter or to a new wheel in ten seconds. No tools required on top of the car. Inspections, repairs, adjustments and lubricating done at work bench later on when no schedules are being held up.

Bayonet Trolley Base with Detachable Pole Clamp

is the only trolley clamp made on which the trolley pole can be changed in 30 seconds and the wheel be in perfect alignment with the wire. No tools are required to do this job. It prevents schedules being delayed. A uniform wire pressure at all angles of the pole is obtained, thus saving on your overhead, wheel and wire.



Bayonet Sleet Cutters

have no superiors when it comes to cutting ice from the wire. Both rigid and semi-rotary types furnished.

Bayonet Trolley Harp Co.
Springfield, Ohio

CYPRESS

"THE WOOD ETERNAL"

is NOT the *Best Lumber for ALL Railway Purposes*. For certain specific applications, however, in which railways have large lumber requirements, the use of all-heart Cypress develops very large *economies* in *maintenance costs*. For example, the Railway Signal Association in its standard specifications for wood to be used for "Trunking and Capping" has always placed all-heart Cypress among the first choices in the list of suitable woods.

The Railway Signal Association makes its recommendations as a result of definite *knowledge* of the subject, and its membership includes many able men who are Cypress enthusiasts. We gladly refer all doubters as to Cypress superiority to any well-posted railway engineer who has had experience with Cypress, "the wood eternal."

The same conditions of service which make Cypress superior for "Trunking and Capping" are present in many other railway lumber requirements, such as

FENCING

and similar purposes where the material is exposed constantly to the weather, and where it is consequently essential that it shall be highly capable of *resistance to decay*. That is the great and particular value of Cypress—it is *highly resistant to decay*. (All-heart especially.)

If railway men in general will study the question of wood durability for other uses as carefully as Railway Signal men have studied it in connection with "Trunking and Capping," there will be a lot more all-heart Cypress used in railway service—*to the very great economy of the companies using it*.

Our data is at your service.

SOUTHERN CYPRESS MFRS' ASS'N

1265 Perdido Building, New Orleans, La., or
1265 Heard National Bank Building, Jacksonville, Fla.

Write us for more information.
FORD TRIBLOC

"—to be trusted"

FORD CHAIN HOISTS are built to be trusted. With them, men lift heavy loads, where a slip would be fatal, in the same confidence that they swing a sledge or pick up a crowbar. Because those who have used the FORD TRIBLOC know that it can be trusted to carry with safety and work with speed and sureness.

The Loop Hand Chain Guide is a feature which will commend itself to any one who has tried to work an ordinary chain hoist from the side — and found trouble.

2178-D

FORD CHAIN BLOCK CO.
2ND & DIAMOND STREETS PHILADELPHIA, PA.

OVER-SEAS REPRESENTATIVE
ALMACOA ALLIED MACHINERY COMPANY OF AMERICA ALMACOA
51 CHAMBERS ST. NEW YORK, U.S.A.

PARIS BRUSSELS TURIN BARCELONA RIO DE JANEIRO

Trolley Poles

Massey Hollow Reinforced Concrete Poles for trolley supports have all the strength of steel poles, combined with the permanence, rigidity and lack of maintenance expense which characterize reinforced concrete.

Made by a special centrifugal process that insures their lightness and strength, Massey trolley supports require practically no maintenance and provide a support which is particularly pleasing in appearance.

MASSEY CONCRETE PRODUCTS CORPORATION Peoples Gas Building CHICAGO, ILLINOIS

New York 50 Church Street | Pittsburgh Oliver Building | Atlanta Candler Building | Dallas Sumpter Building | St. Louis Railway Exchange Building | Salt Lake City 925 So. 6th Street, West

A perfect Wood
Strain Insulator
—a perfect
Crossover—
both made by

Double Take-Up Wood Strain Insulator

Anderson Crossovers

ANDERSON

In the adjustment of the Anderson Double Take-Up Wood Strain Insulator, the time and labor is halved. The slack adjusted in half the time and no twisted guy wires. The great tensile strength, perfect adjustment, and good insulation make it a perfect strain insulator.

Anderson Crossovers are typical of the whole Anderson Line. They mean economy and service to you.

These crossovers are scientifically designed to insure long wear of both crossing and wire, at the point where the strain on both is greatest.

Let us send you Catalogue 8, telling about these in detail.

ALBERT & J. M. ANDERSON MANUFACTURING CO.

289-293 A Street, Boston, Mass., U. S. A.

NEW YORK
135 Broadway

PHILADELPHIA: 429 Real Estate Trust Bldg.
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CHICAGO
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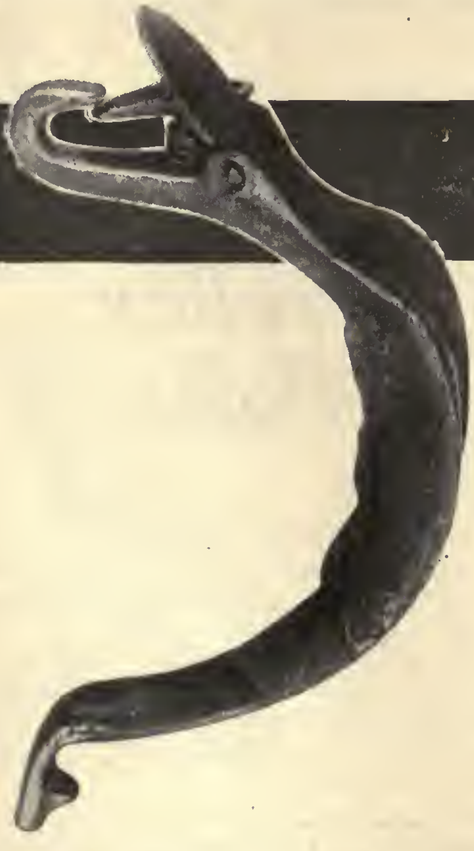


Sleet Cutter

Simple in construction—easy to attach—efficient in operation.

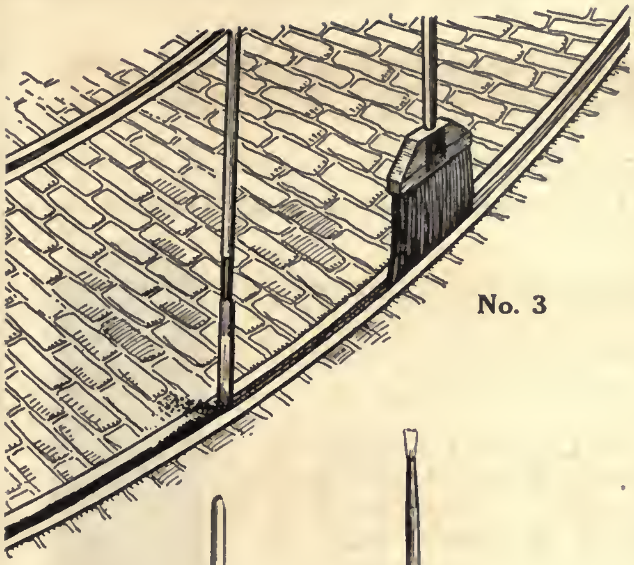
The Sleet Cutter illustrated on this page is made in both malleable iron and brass. It can be readily attached without removing the trolley wheel. It cleanly shears off all accumulations of ice and sleet, leaving a clean, bare wire for the passage of the trolley wheel. It can't injure the wire.

The safety rope-fastening device prevents the cutter from being lost.

Complete data and prices will be mailed upon request. Write today.

The Advance Manufacturing & Tool Co.
Cleveland, Ohio

On a Bitey Zero Morning!



No. 3

Did You Ever See a Trackman working over a frozen switch with the end of a wornout broomstick?

Yes and yet the G. M. wonders why schedules slow up so much!

Give your trackmen Paxson brooms and watch them dig the mud and ice out of a frog with the chisel end of the broom. That's why they like them. Paxson brooms won't break. No weather can interfere with the business end of a Paxson broom. It's made of steel. And it cleans out frogs and crossings in no time.

Made in three types as shown.

No. 1. Flat Wire to sweep crossings.

No. 2. Bamboo for switches, etc., to remove snow and light dirt with or without chisel.

No. 3. Flat Wire for slush, mud and dirt, in curves and switches with or without chisel.

No. 1

No. 2

J.W. PAXSON CO.

J. W. PAXSON CO.
1021 N. Delaware Ave., Philadelphia, Pa.

A Year of Low Voltage!

The railway industry is going ahead. Temporarily, it has been slowed down in certain localities. In some respects it has been operating on low voltage.

Just as the entire industry needs high voltage to prevent losses your individual property needs the Peerless Vawter Direct Reading Rail Bond Testers to enable you to stop the drain on your coal pile by indicating the location of defective bonds and cross-overs.

Flashovers and burnouts caused from low voltage spell trouble. And they always happen in the rush hour when traffic delays are so costly.

One person can locate badly conducting bonds quickly and accurately.

Its use is a "protection insurance" you cannot afford to be without.

Our Specialties:

- Testing Sets
- Wheatstone bridges
- Condensers
- Meter A. C. and D. C.
- Galvanometers
- Pyrometers
- Indicating Ohmmeters
- Photometers
- Tachometers
- Laboratory standards of precision

MADE AND SOLD BY

THOMPSON-LEVERING COMPANY
Electrical Measuring Instruments
PHILADELPHIA, PA., U. S. A.

Efficiency and Reliability

has resulted in

Another Order for 450 Utility Indestructible Thermostats

from the

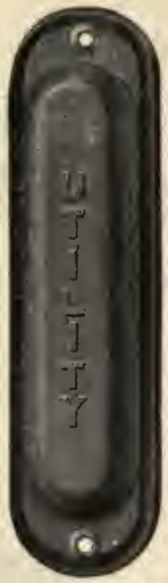
Eastern Massachusetts St. Railway Co.

for the purpose of replacing other inferior mercury and metallic types.

FOR MONITOR DECK OR ARCH ROOF CARS

Complete installation of Utility Honeycomb Ventilators on the Aurora, Elgin & Chicago Railroad. This company, after testing out the Honeycomb Ventilators, has ordered a sufficient number of them to equip all of their third-rail passenger cars, replacing all others, and have also made a complete installation of Utility Indestructible Thermostats.

RAILWAY UTILITY CO.
141-151 W. 22nd St., Chicago
J. H. Denton, Eastern Mgr., Room 1006, 45 W. 34th St., New York
F. S. McNamara, 209 Barth Bldg., Denver
O. W. Meissner, 10 St. Antoine St., Montreal
F. O. Grayson, 600 La Salle Bldg., St. Louis

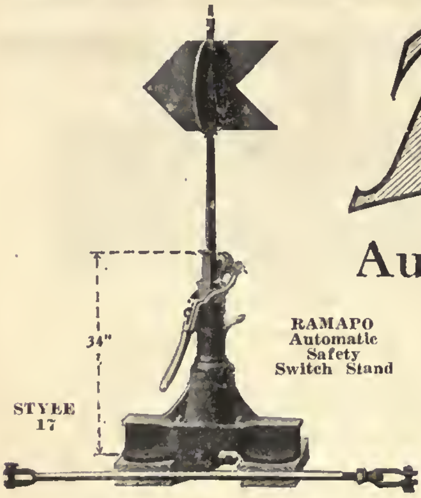


Utility Thermostat

Note the absence of perforations.

Ramapo

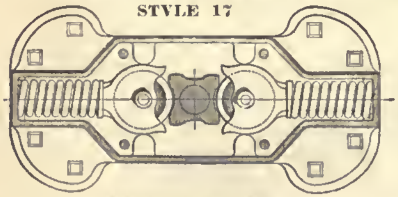
Automatic Switch Stands
in
Medium Heights
and
Dwarf Styles



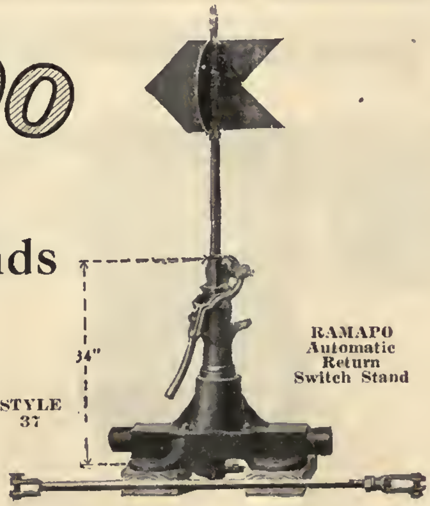
STYLE 17

RAMAPO Automatic Safety Switch Stand

A Sectional View of Automatic Safety Switch Stand
STYLE 17



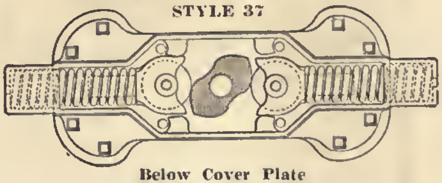
Below Cover Plate Showing Automatic Mechanism



STYLE 37

RAMAPO Automatic Return Switch Stand

A Sectional View Automatic Return Switch Stand
STYLE 37

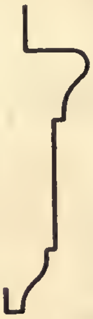


Below Cover Plate Showing Mechanism Half Thrown Automatically

TEE RAIL
SPECIAL WORK
for Interurban Lines and
Private Right of Ways

Manganese
Street and Steam Crossings
a Specialty

RAMAPO IRON WORKS
HILLBURN · NEW YORK
Plants at Hillburn, N.Y. *and* Niagara Falls, N.Y. *New York Office* 30 Church St.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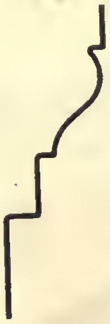
DAHLSTROM
Metal Mouldings & Shapes


264-A

METAL ELECTRIC CAR SHAPES

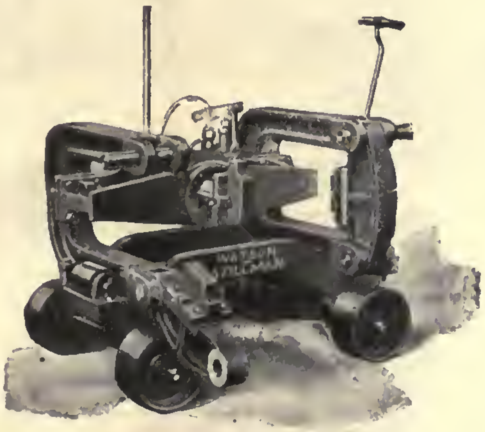
The use of steel to replace wood for mouldings, glass channels, window sash, window stools and beams, siding and doors has proven an evolution in the building of electric street and interurban cars.

It has been found that steel reduces upkeep costs for electric cars as well as for steam railway coaches, building equipment and practically all work where steel has been used to replace wood.

The Dahlstrom line of shapes for car work drawn from stock dies is most complete. Our catalog will be gladly sent on request.

Dahlstrom Metallic Door Company
431 BUFFALO STREET JAMESTOWN, NEW YORK
New York Office 130 East 15th Street
Chicago Office 19 S. LaSalle St.
Representatives In All Principal Cities

You Can Bend Rails Quickly and Economically With a Watson-Stillman Hydraulic Rail Bender


Hydraulic Portable Rail Bender

The portable rail bender shown herewith is designed for use on the road. It is equipped with interchangeable formed bending blocks, and will make any bend without buckling. The hinged yoke permits the rails to be put in sidewise. It can also be used for other heavy bending.

We build many other handy tools for the railway shop. Such as: Crank Pin Presses, Wheel Presses, Forcing Presses, Forging Presses, Jacks, Pit Jacks, Punches, Shears, Pumps, Accumulators, etc.

Write for Catalogs.

The Watson-Stillman Co., 46 Church St., New York
Chicago: McCormick Building Philadelphia: Widener Building

Beg to advise that we have used these for a period of perhaps four years with great success. We have 106 miles of telephone circuit in our dispatching system, 89 miles of which is paralleled by our 33,000 Volt transmission line. Trouble due to lightning on our dispatcher's switchboard is a rare occurrence.

They also serve as a static drain when our electrolytic lightning arresters are being charged.

Four Years With Great Success

is the experience of one large railway with Primo Giant "Vac-M" Lightning Arrester.

Nothing counts like the unbiased opinion of the user. On this property, high tension disturbances were not permitted to interfere with electric train dispatching because "Vac-M" protection was assured.

The National Electric Specialty Co.
Terminal Bldg., Toledo, Ohio

The Blaw Single Line Bucket is operated completely from the cage of a single-drum monorail crane — it digs from storage pile or car; transports and dumps coal, sand, gravel, cement, cinders and other bulk materials at high speed without hand labor.

There is a Blaw Bucket for every class of service—a single-line, two-line, three-line or four-line bucket for every kind of hoisting equipment.

Complete stocks of Blaw Buckets are maintained in convenient localities covering every section of the country—quick delivery, with the services of an expert bucket engineer, is at your command at all times.

Ask about it.

BLAW-KNOX COMPANY
PITTSBURGH, PA.
613 Farmers Bank Bldg.
NEW YORK · BOSTON · CHICAGO
DETROIT · SAN FRANCISCO

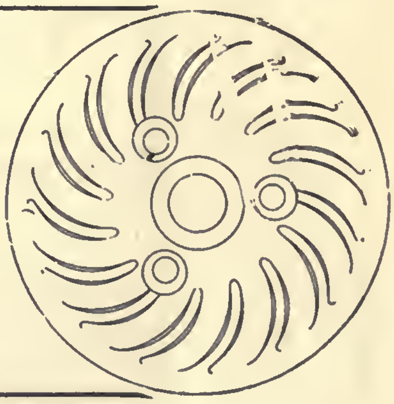
HENSLEY

Hensley Trolley Wheel performance is guaranteed. We shall send any railway as many wheels as it desires with a positive understanding that they may be returned to us for credit even after being worn out if all we claim about the Hensley trolley wheel does not result in the test.

Hensley better-made trolley wheels of "Resisto" Bronze permit us to guarantee its performance.

Hensley Trolley & Mfg. Co.
Detroit, Mich.

Griffin Wheel
Company
McCormick Building
Chicago, Ill.



GRIFFIN F. C. S. WHEELS

For Street and Interurban Railways

All of our plants have adequate facilities for fitting wheels to axles

FOUNDRIES:

Chicago **Detroit** **Boston** **St. Paul** **Tacoma**
Denver **Kansas City** **Los Angeles**

QUALITY SHOPS

New Year's Greetings

St. Louis Car Company
St. Louis, Mo.

"The Birthplace of The Safety Car"

SAFETY CARS

They are uniform in quality

They talk for themselves

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227 Fulton Street
New York City

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Canadian Distributors:
Lyman Tube & Supply Co., Ltd.
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American Rail Bonds

CROWN
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TWIN TERMINAL
SOLDERED
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*Send for new
Rail Bond book*

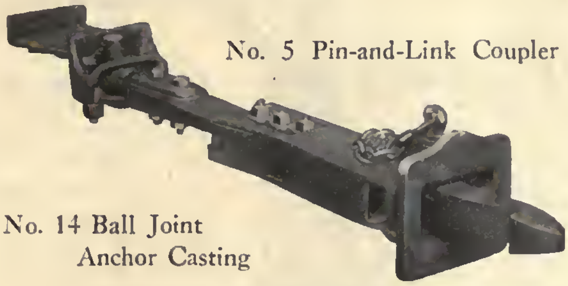
American Steel & Wire Company
CHICAGO
NEW YORK

VAN DORN AUTOMATIC PIN-AND-LINK COUPLERS

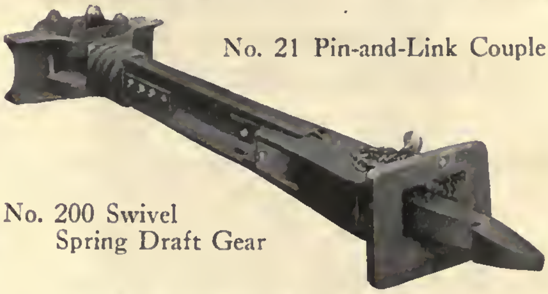
Are Noted for:

Maximum Strength, Light Weight
Simplicity of Design

Economy of Operation
Dependability in Service



For Light City Service



For Interurban Service

Reversible link and extra pin hole double the life of the Coupler. Link may be turned end for end and the pin placed in other hole. Couple automatically by impact and uncouple by pulling out one pin.

An important feature of all VAN DORN Couplers is the fact that only one man is needed to switch cars. After the trainman has unlocked Couplers by pulling one pin, it is not necessary for him to be near them—thus enabling him to operate cars when uncoupling, and eliminating possibility of accidents.

Ball Joint of No. 5 Coupler acts as Anchor Casting and permits free movement of cars in rounding curves and passing over crossings.

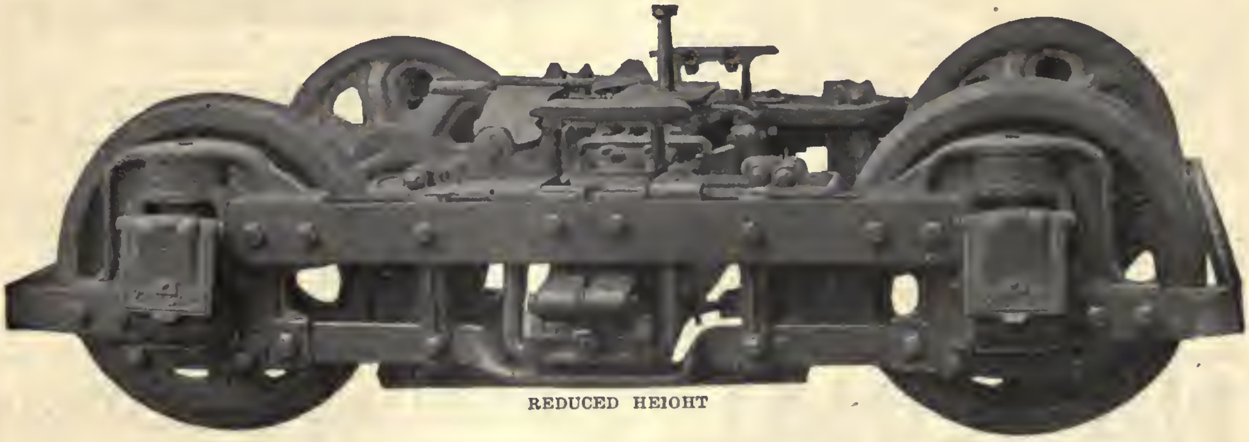
Double Spring Draft Gear of No. 21 Coupler, absorbs shocks direct at every position of 120 degree radial movement, thus relieving strain on equipment at all times.

Let us tell you about a VAN DORN Coupler that will suit your requirements satisfactorily and economically. Your request for information will imply no obligation.

VAN DORN COUPLER COMPANY, 2325 S. Paulina St., Chicago, Ill.

R. H.

TAYLOR REDUCED HEIGHT TRUCK



TAYLOR R. H. TRUCK

Mounted on 26-in. Wheels with Springs Over Journal Boxes.
Designed to Mount Centre and End Entrance Cars Low Down.

SWING MOTION AND FULL ELLIPTIC SPRINGS

Wheel Base 5 ft. 2 in. For Car Bodies weighing 16,000 to 22,000 lb. Motors Inside Hung.

EASY RIDING

Journals 3¾ x 7 M. C. B. Type. Height from Rail to Body Bolster, 22¾ in. Brakes Inside Hung.

TAYLOR ELECTRIC TRUCK CO., TROY, N.Y.

SPECIFICATIONS ON REQUEST — Established 1892 — SEND FOR PORTFOLIO

Aluminum Company of America
General Sales Office
2400 Oliver Bldg., Pittsburgh, Pa.

PRODUCERS *of* ALUMINUM
Manufacturers of
ELECTRICAL CONDUCTORS
for
Industrial, Railway and Commercial Power Distribution
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also
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Northern Aluminum Co., Ltd., Toronto
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When you put your money into KERITE you make an investment in service. You do more than buy conductors, insulation and protection. You obtain the best possible combination of the most desirable qualities in permanent form. KERITE remains long after the price is forgotten.

KERITE INSULATED WIRE & CABLE COMPANY
NEW YORK CHICAGO

1870-EUGENE F. PHILLIPS-AMERICAN ELECTRICAL WORKS-1882.

WEATHERPROOF WIRE AND CABLE
PAPER INSULATED UNDERGROUND CABLE
(Single, Duplex and Three Phase)
TROLLEY WIRE
(Round, Grooved or Figure 8)
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(Cotton or Asbestos)

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AMERICAN ELECTRICAL WORKS
Phillipsdale, R. I.

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Wire Rope and Wire
Electrical WIRES and CABLES
JOHN A. ROEBLING'S SONS COMPANY, Trenton, N. J.

Peirce Forged Steel Pins with Drawn Separable Thimbles
Your best insurance against insulator breakage
Hubbard & Company
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"NATIONAL"
TUBULAR STEEL POLES
The Recognized Standard for Electric Railways
Ask for "NATIONAL" Bulletin No. 14
NATIONAL TUBE COMPANY PITTSBURGH, PA.

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OFFICE AND WORKS: RANKIN, PA. BRADDOCK P. O.
WESTERN SALES REPRESENTATIVES: STEEL SALES CORPORATION, CHICAGO, ILL.
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"Copperweld"—a copper conductor with the strength of steel. Cheaper, stronger, better than copper wire.

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Specialists in Street Railway Requirements
Write for List
TIES—TIMBERS—POLES—PILING
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Cross Ties
Railroad Lumber

IF you want—
WHAT you want
WHEN you want it

It will interest you to know that we can ship ties, treated or untreated, immediately from stock in our yards.

We carry all kinds and grades.

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"The Shippin' Fools"

"ACME" (NESTABLE) Anti-Corrosive Galvanized Corrugated CULVERTS

Quite a saving in freight charges was made by shipping these 3,060 feet of "ACME" Corrugated Culverts knocked down instead of set-up, as only one car was needed. The same amount set up would have required two or three cars.

"ACMES" shipped knocked down are easier to handle and haul than full circle culverts.

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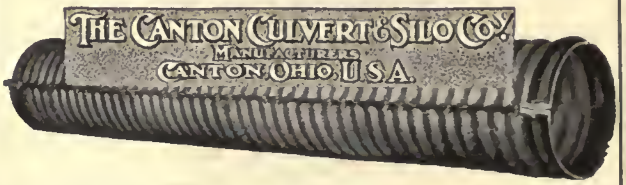
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MANUFACTURERS
CANTON, OHIO, U.S.A.

SPECIALISTS
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Design and Manufacture
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Standard—Insulated—and Compromise Rail Joints.

The Rail Joint Company
61 Broadway, New York City

HIGH-GRADE TRACK WORK

SWITCHES—MATES—FROGS—CROSSINGS
COMPLETE LAYOUTS
IMPROVED ANTI-KICK BIG-HEEL SWITCHES
HARD CENTER AND MANGANESE CONSTRUCTION

New York Switch & Crossing Co.
Hoboken, N. J.

EUREKA PRODUCTS

Commutators, Trolley Wheels, Sleet Trolley Wheels, Trolley Ears, Line Material, Controller Fingers, Brush Holders, etc.

We make quality goods.

THE EUREKA COMPANY, North East, Pa.

SPECIFY

THE TERRY TURBINE

For Driving Your Auxiliaries

TERRY STEAM TURBINE CO.
Hartford, Conn

THE SCOOP CONVEYOR

THOUSANDS IN USE

FOR STORING AND RECLAIMING, LOADING AND UNLOADING CARS, TRUCKS AND WAGONS
DOES THE WORK OF FROM 6 TO 12 MEN
AND KEEPS EQUIPMENT MOVING
WRITE FOR LITERATURE

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Transmission Line and Special Crossing Structures, Catenary Bridges

WRITE FOR OUR NEW DESCRIPTIVE CATALOG.

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Engineers & Contractors SYRACUSE, N. Y.

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GEARS
OF
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PROTECTED WITH

BORNE SCRYMSER COMPANY
METAL LIFE
FOR
-CABLES-
GEARS
PINIONS
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ASK US FOR
FACTS

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Established 1858

Manufacturers of
Special Work for Street Railways
Frogs, Crossings, Switches and Mates
Turnouts and Cross Connections
Kerwin Portable Crossovers
Balkwill Articulated Cast Manganese Crossings

ESTIMATES PROMPTLY FURNISHED

HIGHEST QUALITY
TRACK SPECIAL WORK

HIGHEST QUALITY SAFETY DURABILITY
C F & C Co
FROGS CROSSINGS SWITCHES STANDS

WE MAKE THIS GRADE ONLY

CLEVELAND FROG & CROSSING CO.
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STEAM

IN 1898
STEAM SUPERHEATERS

Were introduced commercially in the United States by this Company. Owners of boilers it has built—Babcock & Wilcox, Stirling and Rust—not now equipped with these coal-saving accessories can obtain information about superheating possibilities from the nearest office listed below.

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A necessity for turbine protection, engine cylinder economy and utilization of superheat for all its benefits

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WE-FU-GO AND SCAIFE
WATER
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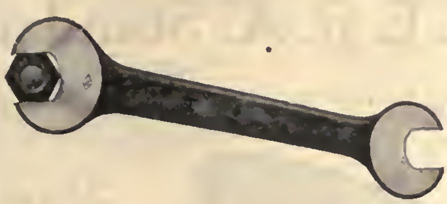
Aladdin's Lamp
has nothing on the
"Searchlight"

When an advertiser sells equipment for over $4,000.00 through "Searchlight" advertising that cost $12.00, we think "Searchlight" is at least entitled to "favorable mention."

615

Searchlight Section
Employment — Equipment — Business Opportunities



Notice how the mechanic handles a Williams Drop-Forged Wrench. There is confidence in his very grip—he knows the trade mark, ◇W◇ has stood for quality for nearly half a century.

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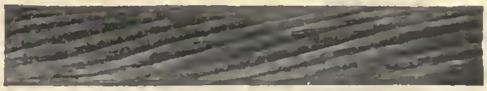

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Circular Mils 66832 Code Word: DESIRE

SHOE SHUNT CABLE

Especially Designed for Third Rail Electric Roads

259 Wires, each No. 24 B. & S. Gauge; Diameter $\frac{27}{64}$"
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Samples and Prices to Any Interested Electric Railroad Upon Request

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Webbings and Tapes made from the best raw materials—made with the most up-to-date machinery and most reasonably priced. That's what you get in Hope Products.

Send for Samples.

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Use only Awebco Tape on your Armatures
Field Coils have better protection when wound with "AWEBCO Tape". Send for samples.

ANCHOR WEBBING COMPANY
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"Everything in Insulation"

Mica
Vulcanized Fibre
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Insulating Tapes
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Insulating Varnish

The above are only a few of our products
Write us for anything in this line you may require.

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A Single Segment or a Complete Commutator

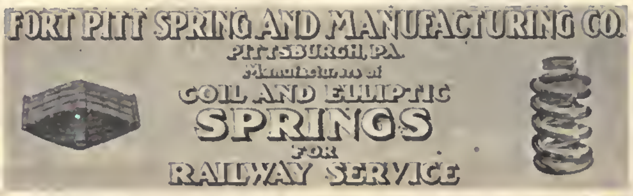
is turned out with equal care in our shops. The orders we fill differ only in magnitude; small orders command our utmost care and skill just as do large orders. CAMERON quality applies to every coil or segment that we can make, as well as to every commutator we build. That's why so many electric railway men rely absolutely on our name.

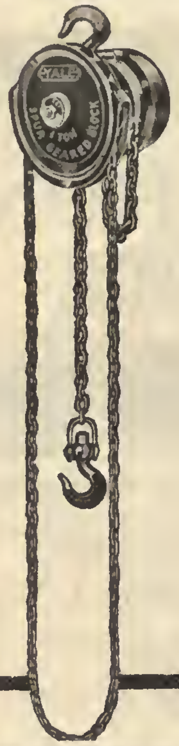
Cameron Electrical Mfg. Co., Ansonia, Connecticut

BUCKEYE JACKS

high-grade R. R. Track and Car Jacks.

The Buckeye Jack Mfg. Co.
Alliance, Ohio





TRADE **YALE** MARK

Yale Made Is Yale Marked

The Block of a Thousand Uses

THE Yale Chain Block has won a place among the tools of industry that is truly enviable. No man has ever calculated the extent of its usefulness, because new uses are being discovered every day.

Lifting, lowering, setting into position, and holding any weighty object with a minimum use of man-power and with utmost safety, tells the story only too briefly.

Yale Chain Block Booklets contain many pictures of actual application. A postcard will bring one—free.

Made by the makers of Yale Padlocks, Night Latches, Builders' Hardware, Cabinet and Trunk Locks, Door Closers, and Yale Electric Hoists, Electric Industrial Trucks, Tractors and Trailers.

The Yale & Towne Mfg Co.
Stamford Conn.

Brake Shoes
A. E. R. A. Standards

Diamond "S" Steel Back is the Best Type

Standard Patterns for

SAFETY CAR

D-67 for Narrow Treads
D-87 for Wide Treads

American Brake Shoe and Foundry Co.
30 Church Street, New York
332 So. Michigan Ave., Chicago Chattanooga, Tenn.

The Acme of Insulation

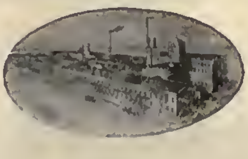
By saturating with raw BAKELITE, heating and pressing paper, a strong insulating material is made. Possessing the well-known properties of BAKELITE plus great mechanical and dielectric strength.

This product is known as

BAKELITE-DILECTO

(Insulating Material)
Vulcanized Fibre, Conite, Continental-Bakelite.

THE CONTINENTAL FIBRE CO.
Newark, Delaware
Branch Offices:
CHICAGO, 332 S. Michigan Ave. NEW YORK, 233 Broadway.
Pittsburgh Office—301 Fifth Ave. San Francisco Office—525 Market St.
Los Angeles Office—411 S. Main St.
Canadian Office, 1710 Royal Bank Bldg., Cor. King and Yonge Sts.,
Toronto, Ont., Can.



EST. 1855 AIMCo INC. 1915

"American" Insulating Machinery Company

REG. U.S. PAT. OFF.

PHILADELPHIA PENNSYLVANIA USA.

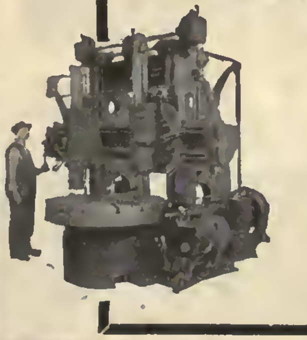
"American" Electric Railway Automatic Signals.
RECLAIMING MACHINES } for recovering
INSULATING MACHINES } insulated wire

NILES-BEMENT-POND CO.

111 BROADWAY, NEW YORK

MACHINE TOOLS

FOR ELECTRIC RAILWAYS



Axle Lathes
Wheel Presses
Car Wheel Lathes
Boring Mills
Lathes
Hammers
Cranes
General Machine Tools

Bound Brook Trolley Wheel Bushings Give Longer and Better Service

THERE are more Bound Brook (Oil-less) Trolley Wheel Bushings in use today than all other makes combined. That is because Bound Brook Bushings, by virtue of their construction, invariably outlast all other types.

All Genuine Graphited Oil-less Bushings have always been made at Bound-Brook, U. S. A.

BOUND BROOK OIL-LESS BEARING COMPANY
Bound Brook, New Jersey ***Detroit Office: 1723 Ford Bldg.***

Railroad and Tram Car Specialties

New inventions developed, perfected
and worked for the English market

Messrs. G. D. Peters & Co., Ltd.
Windsor Works, Slough (Bucks), Eng.

PERLEY A. THOMAS
CAR WORKS

Manufacturer of Cars
and Car Materials

Cars of all types from one-man to large interurban

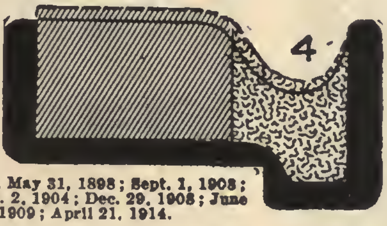
HIGH POINT, N. C.

SASHES, DOORS
INTERIOR FINISH
VESTIBULES AND FRAMING

CURTAINS, VENTILATORS
SASH AND DOOR TRIMMINGS
DOOR AND STEP MECHANISM

Wheel Condition No. 4

When the flange only needs correction, this type of



Wheel Truing Brake Shoe

Pat. May 31, 1898; Sept. 1, 1908; Aug. 2, 1904; Dec. 29, 1908; June 15, 1909; April 21, 1914.

will do it—without jacking car up—without removing trucks—without removing car from service.

It's the economical, efficient way.

Wheel Truing Brake Shoe Co.
Detroit Michigan

McGuire-Cummings Mfg. Company

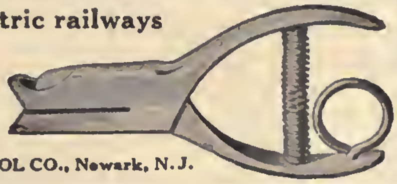
General Offices—111 West Monroe St., CHICAGO

City and Interurban Cars and Trucks,
Snow Sweepers and Plows

Express, Combination and Work Cars,
Electric Locomotives

75% of the electric railways use

B-V Punches



Send for Catalog.
BONNEY-VEHSLAGE TOOL CO., Newark, N. J.

WE CAN CUT YOUR COST OF
HEATING CURRENT

Write for THERMOSTATIC CONTROL INFORMATION

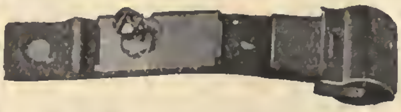
GOLD

ELECTRIC HEATERS Cut Installation and Maintenance Charge.
VENTILATORS Also Ventilate in Stormy Weather.
THERMOSTATS Save Current.
ORIGINATED the use of NON-CORROSIVE Wire for Electric Car Heaters.
ORIGINATED The Ventilated Coil Support.

LET US FIGURE ON YOUR NEXT REQUIREMENTS
Gold Car Heating & Lighting Co., 17 Battery Pl., New York

The CLEVELAND is the practical
Fare Box for the One-Man Car.
Let us tell you why.

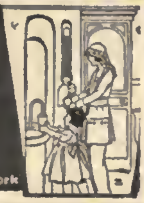
The Cleveland Fare Box Company
Cleveland, Ohio
Canadian Branch, Preston, Ontario.



Russell Mfg. Co.
Makers of
Triggerlock
Reversible
Controller Fingers

which last for years. The tips are renewable and reversible
U. S. Factory: 814-18 Bath Avenue, Niagara Falls, N. Y.
Canadian Factory: 557 King St., West, Toronto, Canada

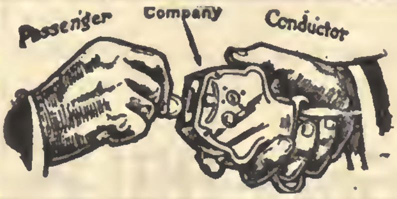
162 RAILROADS
USE DIXIE CUP
Penny Vending Machines
To Solve their Drinking Cup Problems
in Cars and Stations
INDIVIDUAL DRINKING CUP COMPANY, Inc.
HUGH MOORE, President
Original Makers of the Paper Cup — 220-230 W. 19th Street New York



Use them in your terminals—
PEREY TURNSTILES
or PASSIMETERS

Faster than the ticket seller

Percy Manufacturing Co., Inc.
30 Church Street, New York City



Direct
Automatic
Registration
By the
Passenger

Rooke Automatic
Register Co.
Providence, R. I.

Photographs that Sell the Technical product

The McGRAW-HILL FIELD PHOTO SERVICE Department was organized some years ago in response to a widely felt need of furnishing a service through which advertisers could readily and economically secure striking installation pictures of their machines and apparatus in actual use. Approximately 700 McGRAW-HILL photographic representatives, locally distributed in all parts of the country, are now engaged in this work.

THESE photographers are carefully chosen for their prompt dependability in getting the picture they are asked to get—for their judgment shown in "taking" subjects to best advantage from an advertising standpoint—for their skill displayed in making photographs that reproduce effectively, and for their ability to get the news story while taking the picture.

This latter qualification is extremely important. Every effort is made to obtain the actual story of the machine on the job, and to assist in this we supply our photographers with carefully devised questionnaires to be filled out. The Field Photo Service Department always aims not only to get the picture but to get the story, and we make it a practice not to accept photographs from our photographers unless they are accompanied by the data.

THE advantages of this branch of McGRAW-HILL service to technical advertisers are obvious. Upon receipt of a list of installations we arrange all the interviews and secure the pictures. You are relieved of all worry and trouble and get your pictures and the story at minimum expense, besides having the satisfaction of putting the work into the hands of specialists on technical subjects.

MANY advertisers not only employ our Field Photo Service to secure definite lists of photographs, but give us a roving commission to take pictures of their machines wherever encountered.

IN connection with this department of McGRAW-HILL service we maintain a constantly growing library of stock negatives in the technical field. It contains at the present time about 3,000 photos, all of which are classified by subjects. Prints are promptly supplied at a moderate charge.

This Library of Technical Photographs is of special value to Advertising Agencies, a number of which frequently call upon its resources.

THE facilities of our organization for obtaining photographs of technical subjects are at the service of all who require such photographs. Primarily, however, it is an important link in the complete chain of McGRAW-HILL service to the technical advertiser. We not only write the proper copy for our advertisers, but we go out into the field for them and obtain pictures and stories which they are not in a position to get for themselves.

WE will gladly furnish detailed information regarding the cost and answer any questions.

McGraw-Hill Company, Inc.
Tenth Avenue, at 36th Street
New York City

Power Coal Age
American Machinist Electrical Merchandising
Electrical World Engineering and Mining Journal
Journal of Electricity Engineering News-Record
Ingenieria Internacional Electric Railway Journal
Chemical and Metallurgical Engineering

McGraw-Hill Field Photo Service

We photograph your product on the job anywhere, and get the story of its service Available photos also supplied from stock — Specialists on technical subjects

ELECTRIC RAILWAY JOURNAL

Think "SEARCHLIGHT" First

ADVERTISING RATES

POSITIONS VACANT—Business Opportunities and other undisplayed ads, 8 cents a word, minimum $2.00 an insertion.

POSITIONS WANTED—Evening work wanted, tutoring and other undisplayed ads of individuals looking for employment, 4 cents a word, minimum 75 cents, payable in advance.

ADD 5 WORDS for box number in undisplayed ads if replies are to any of our offices. There is no extra charge for forwarding replies.

DISCOUNT OF 10% if one payment is made in advance for 4 consecutive insertions of undisplayed ad.

ADS IN DISPLAY TYPE—Space is sold by the inch (30 in. to a page), the price depending upon total space used within a year, some space to be used each issue.

RATE PER INCH for ads in display space:

1 to 3 in., $4.30 an in.	15 to 29 in., $3.90 an in.
4 to 7 in., $4.30 an in.	30 to 49 in., $3.80 an in.
8 to 14 in., $4.10 an in.	50 to 99 in., $3.70 an in.

POSITIONS VACANT

EMPLOYMENT

POSITIONS WANTED

POSITIONS VACANT

MASTER mechanic wanted for Middle West on a division operating 40 interurbans on 600-1,200 volts. P-787, Elec. Railway Journal, Leader-News Bldg., Chicago.

POSITIONS WANTED

CONSTRUCTION superintendent high-tension transmission, catenary or cross-country interurban; extensive experience. Can apply machinery and give low cost; age 48. PW-813, Elec. Ry. Journal, Real Estate Trust Bldg., Philadelphia.

YOUNG man, single; now employed, desires to make change; 14 years' experience in transportation department of large Eastern railway; capable of supervising car house or system; make own schedules for short haul or interurban service. PW-818, Elec. Ry. Journal.

AGENTS AND SALESMEN

Electrical Salesman Wanted

Eastern manufacturer of electrical specialties has opening in New York City for an experienced salesman to handle electric railway and large industrial plant trade; good opportunity; permanent. State experience and present salary; confidential. AS-820, Elec. Ry. Journal, Real Estate Trust Bldg., Philadelphia.

FOR SALE

1—25 ton, electric

Traveling Crane

or hoist symbol made by Niles-Bement-Pond Co.; center to center of runway rails, 78 ft. 4 in.; approximate vertical travel of hook, 24 ft.

United Electric Light Co.
Springfield, Mass.

FOR SALE

16 West. 56 Motors. 4 K-14 Controllers. 4 National type BB-4 Air Brake Equipments complete. 15 Double Truck Cars, 40-ft. long, mounted on Brill Trucks equipped with 4 GE-67 Motors, 2 K-6 Controllers, Air Brakes, etc., complete.

Electric Equipment Co.
Commonwealth Building, Philadelpnia, Pa.

STREET CARS

3—32-ft., 4-ft. 8½-in. ga. closed motor cars; seating capacity 32, Symington-Baldwin trucks. First Class. Will convert to one man operation if desired.

4—22-ft., 4-ft. 8½-in. ga., open trailers; seating capacity 35. Taylor McGuire trucks. Good.

ZELNICKER IN ST. LOUIS

For a list of hundreds of other unusual bargains in Rails, Railway and Industrial Machinery and Equipment write for Our Latest General Bulletin.

Armature Coil Taping Machine

Saves Time, Labor and Money

A boy can tape 40 coils for Westinghouse 12A Armature in an hour. Further particulars gladly furnished.

Geo. M. Griswold Machine Co.
New Haven, Conn.

NEW
REBUILT **ELECTRIC MOTORS** REWINDING
REPAIRING

NEW A.C. MOTORS ½ to 15 H.P.—LARGE STOCK USED MOTORS
EXCELLENT REPAIR SERVICE ON ANY SIZE OR TYPE

CLEVELAND ARMATURE WORKS, INC.

EST. 1895 4732-4-6 ST. CLAIR AVE., CLEVELAND O. *INC. 1918*

New—Used—Rebuilt

MACHINERY AND SUPPLIES
for construction and industrial work

READING ENGINEERING CO., INC.
154 Nassau St., New York

COMPLETE POWER PLANT

FOR SALE

1—500 h.p. Westinghouse Compound Engine, Direct Connected to 550 volt Generator.

2—200 h.p. Harrisburg Engines, Belt Connected to Westinghouse Generators.

1—B & W Boiler, 2 Keeler Boilers, Water Heaters, Pumps, Piping, Switchboards and etc.

All in first class operating condition. Immediate delivery. Make us an offer.

The Lewistown & Reedsville Electric Railway Co., Lewistown, Pa.

Keep your Eye

on the

Searchlight

and your

Advertisements in it

0197

NEW—80-LB. RAIL and ACCESSORIES

Angle Bars, Spikes, Bolts and Nuts Complete

FOR SALE

A.R.A. "TYPE B" RAIL

Approximately 30,000 gross tons—standard lengths

Stored at Kearney, New Jersey

We buy electric and steam railways that are to be dismantled

HYMAN-MICHAELS COMPANY

NEW AND RELAYING RAILS

Peoples Gas Building, Chicago, Ill.

New York Office:
1324-1326 Woolworth Bldg.

Pittsburgh Office:
1312 First National Bank Bldg.

St. Louis Office:
2115 Railway Exchange Bldg.

The advertisements in the

SEARCHLIGHT SECTION

of this paper

constitute the most comprehensive group of "live" opportunities to be found in any publication serving this industry.

Each announcement represents a current Want of a concern or individual in the industry with some element of profit in each for whoever can fulfill the need. Some have money saving possibilities, others are opportunities for more business; many are employment opportunities while still others offer chances to buy going businesses, plants, property, etc.

"Searchlight" advertisements are constantly changing. New opportunities find their way into this great Want medium each issue. Regular consultation of the "Searchlight" pages should be as important to the careful reader as reading editorial articles of his particular liking. One is news of the industry, the other, the NEWS OF OPPORTUNITIES being offered in the industry. No one can afford to overlook opportunities.

For Every Business Want

"*Think* SEARCHLIGHT *First*"

0140

—a manufacturer
in Newark, N. J.
—saved $200
buying from an Indiana dealer in
—second-hand machinery
through his advertising in the
—searchlight section

It pays
to read the Searchlight.
It pays
to advertise in the Searchlight.

0058

Machinery in Stock for *Immediate Shipment*

ROTARY CONVERTERS

1—300 kw., Westg., 3-phase, 60-cycle, 370-v., A.C., 575-v., D.C., 600 r.p.m.
2—200 kw., G.E., 3-phase, 25-cycle, 85-v., A.C., 125-v., D.C., 8 pole, 375 r.p.m.

FREQUENCY CHANGER SETS

1—600 kva., Allis-Chalmers Frequency Changer Set, 300 r.p.m., 3-phase, 60-cycle, 2300-v. one end, 3-phase, 6600-v., 25-cycle on other end.
1—400 kw., G. E., 3-phase, 25-cycle, 6000-v. one side—2400-v., 2-phase, 60-cycle other side—375 r.p.m.

ARCHER & BALDWIN, INC.
114-118 Liberty Street, New York City
Telephone 4337-4338 Rector

There is a
Searchlight Section
in each of
the following papers:

[1]
American Machinist

[2]
Chemical and Metallurgical Engineering

[3]
Coal Age

[4]
Electrical World

[5]
Electrical Merchandising

[6]
Electric Railway Journal

[7]
Engineering and Mining Journal

[8]
Engineering News-Record

[9]
Power

[10]
Ingenieria Internacional
(International Engineering—Spanish)

Each of these 10 papers is the leading periodical of the field it serves.

Searchlight advertisements will get you in touch with the important men of these important fields.

0062

FOR SALE

Two 300-H.P. 500 Volt MILL MOTORS

Two Westinghouse 300-h.p. 345 to 500 r.p.m., 500 volt, D.C., compound wound motors, with one spare armature, including two Cutler Hammer, 300-h.p., 500 volt, D.C. Starters.

Condition good. Ready for inspection. Reason for selling, voltage changed. Write

H. LLEWELLYN, General Purchasing Agent
PITTSBURGH STEEL PRODUCTS CO.
Union Arcade Bldg., Pittsburgh, Pa.

EVERYTHING FOR TRACK

New and Relaying Rail

FITTINGS AND TOOLS

TRACK SPECIALTIES CO.
29 Broadway, New York City.

Immediate Shipment

GIRDER RAIL

300 tons 7 in. girder rail, located Amityville, New York, also 1000 tons 70 lb. rail, 2000 tons 90 lb. rail. Write or wire for prices quoted.

M. K. FRANK, Pittsburgh, Pa.

Due to Change in Equipment We Offer for Sale the Following New Material in Good Condition

75—W. H. 56 Straight Bore Case Hardened Tool Steel Pinions, 15 teeth 3-in. Bore, Taper Bore 1,219 in. per foot.
150—Lorain 27-G Taper Bore Pinion, 17 Teeth, Large Bore 2⅝-in., Taper Bore 1,091-in.
4200 lbs. No. 3 B & S Gauge Magnet Wire D. C. C.
7000 lbs. No. 6 B & S Gauge Magnet Wire D. C. C.
900 lbs. No. 17 B & S Gauge Magnet Wire D. C. C.
250 Rolls ⅝-in. Aluminum Ribbon.
25—G. E. 800 Commutators (Assembled Segments).
63 lbs. Hope No. 1 White Sleeving.
50 Pinions for Air Compressors A A 1.
10 Gears for Air Compressors A A 1.
1—Motor-Driven Ticket Destroying Machine.

PHILADELPHIA RAPID TRANSIT COMPANY
Purchasing Department — 820 Dauphin Street, Philadelphia

For Every Business Want: "Think SEARCHLIGHT *First"*

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Air Receivers
Chicago Pneumatic Tool Co.
Ingersoll-Rand Co.

Air Aftercoolers
Chicago Pneumatic Tool Co.
Ingersoll-Rand Co.

Air Pressure Relays
Electrical Development Mach. Co.

Ammeters
Weston Elec'l Instrument Co.

Anchors, Guy
Crouse-Hinds Co.
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Angle Bars
Lackawanna Steel Co.

Automoblie and Buses
Brill Co., The J. G.

Axle Straighteners
Columbia M. W. & M. I. Co.

Axles, Car Wheel
Bemis Car Truck Co.
Brill Co., The J. G.
Carnegie Steel Co.
Midvale Steel & Ordnance Co.
Standard Steel Works Co.
St. Louis Car Co.
Taylor Electric Truck Co.
Westinghouse Elec. & M. Co.

Babbitt Metal
Ajax Metal Co.
More-Jones B. & M. Co.

Babbitting Devices
Columbia M. W. & M. I. Co.

Badges and Buttons
Electric Service Supplies Co.
International Register Co., The

Bankers & Brokers
Coal & Iron National Bank

Batteries, Dry
Nichols-Lintern Co.

Batteries, Storage
Electric Storage Battery Co.

Bearings and Bearing Metals
Ajax Metal Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
More-Jones Brass & Metal Co.
St. Louis Car Co.
Taylor Electric Truck Co.
Westinghouse Elec. & M. Co.

Bearings, Center and Roller Side
Stucki Co., A.

Bearings, Rolling and Ball
Gurney Ball-Bearing Co.

Bells and Gongs
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
St. Louis Car Co.

Benders, Rail
Niles-Bement-Pond Co.
Watson-Stillman Co.
Zelnicker, Walter A., Supply Co Inc.

Boilers
Babcock & Wilcox Co.

Boiler Tubes
National Tube Co.

Bond Testers
American Steel & Wire Co.
Rail Welding & Bonding Co.

Bonding Apparatus
American Steel & Wire Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
Ohio Brass Co.
Rail Welding & Bonding Co.

Bonds, Rail
American Steel & Wire Co
Copper Clad Steel Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Rail Welding & Bonding Co.
Westinghouse Elec. & M. Co.

Book Publishers
McGraw-Hill Book Co., Inc.

Boring Tools, Car Wheel
Niles-Bement-Pond Co

Boxes—Junction and Outlet
National Metal Molding Co.

Brackets and Cross Arms, (See also Poles, Ties, Posts, Etc.)
Bates Expanded Steel Truss Co.
Creaghead Eng. Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

Brake Adjusters
National Railway Appliance Co.
Smith-Ward Brake Co.
Westinghouse Traction Brake Co.

Brake Shoes
Amer. Brake Shoe & Fdry. Co.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
St. Louis Car Co.
Taylor Electric Truck Co.
Wheel Truing Brake Shoe Co.

Brakes, Brake Systems and Brake Parts
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
National Brake Co.
Safety Car Devices Co.
St. Louis Car Co.
Taylor Electric Truck Co.
Westinghouse Traction Brake Co.

Brooms, Track, Steel or Rattan
Paxson Co., J. W.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Morganite Brush Co.
United States Graphite Co.
Westinghouse Elec. & M. Co.

Brushes, Graphite
United States Graphite Co.

Brush Holders
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.

Buckets
Blaw-Knox Co.

Bushings, Case Hardened & Manganese
Bemis Car Truck Co.
National Metal Molding Co.

Bushings, Graphite & Wooden
Bound Brook Oilless Bearing Co.

Cables. (See Wires and Cables)

Cable End Bells
Electrical Development Mach. Co.

Carbon Brushes. (See Brushes, Carbon)

Car Panel Safety Switches
Westinghouse Elec. & Mfg. Co.

Cars, Dump
Differential Car Co.

Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
Kuhlman Car Co., G. C.
McGuire-Cummings Mfg. Co.
Midvale Steel & Ordnance Co.
National Railway Appliance Co.
Thomas, Perley A.
Wason Mfg. Co.

Cars, Second Hand
Electric Equipment Co.

Car, Self-Propelled
Electric Storage Battery Co.
General Electric Co.

Castings, Brass, Composition or Copper
Ajax Metal Co.
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.
More-Jones Brass & Metal Co.

Castings, Funnel
Wharton, Jr. & Co., Inc., Wm.

Castings, Gray Iron and Steel
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Standard Steel Works Co.
St. Louis Car Co.
Wharton, Jr. & Co., Inc., Wm.

Castings, Malleable and Brass
Amer. Brake Shoe & Fdry. Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

Catchers and Retrievers. Trolley
Earll, Chas. I.
Electric Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.

Circuit Breakers
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Clamps, Insulator
Electrical Development Mach. Co.

Clamps and Connectors for Wires and Cables
Anderson Mfg. Co., A. & J. M.
Dossert & Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Eureka Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Cleaners and Scrapers Track—(See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
Ohio Brass Co.

Cleats
National Metal Molding Co.

Cleat type Switchboard Insulator
Electrical Development Mach. Co.

Clusters and Sockets
General Electric Co.

Coal and Ash Handling—(See Conveying and Hoisting Machinery)

Coil Banding and Winding Machines
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

Coils, Armature and Field
Cleveland Armature Works
Columbia M. W. & M. I. Co.
General Electric Co.
Independent Lamp & Wire Co.
Westinghouse Elec. & M. Co.

Coils, Choke and Kicking
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Coin-Counting Machines
Electric Service Supplies Co.
International Register Co., The
Johnson Fare Box Co.

Combustion Systems
Engineer Co.

Commutator Slotters
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg Co.

Commutator Truing Devices
General Electric Co.

Commutators or Parts
Cameron Electrical Mfg. Co.
Cleveland Armature Works
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Compressors, Air
Allis-Chalmers Mfg. Co.
Chicago Pneumatic Tool Co.
General Electric Co.
Ingersoll-Rand Co.
Westinghouse Trac. B. Co

Compressors, Gas
Ingersoll-Rand Co.

Concrete Mixers
Blaw-Knox Co.

Concrete Products
Massey Concrete Products Corp.

Condensers
General Electric Co.
Schutte & Koerting Co.
Westinghouse Elec. & Mfg. Co.

Condensor Papers
Irvington Varnish & Insulator Co

Conduit Fittings
Chicago Fuse Mfg. Co
National Metal Molding Co.

Conduits, Underground
Standard Underground Cable Co

Condulets or Conduit Fittings
Crouse-Hinds Co.

Connectors, Solderless
Dossert & Co.
Westinghouse Elec. & Mfg. Co.

Controller Fingers
Eureka Co.
Russell Mfg. Co.

Controllers or Parts
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
Russell Mfg. Co.
Westinghouse Elec. & Mfg. Co.

Controller Regulators
Electric Service Supplies Co.

Controlling Systems
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Converters, Rotary
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Conveyors, Belt
Portable Machinery Co.

Conveyors, Coal & Ash
Portable Machinery Co.

Conveyors, Portable
Portable Machinery Co.

Conveying and Hoisting Machinery
Columbia M. W. & M. I. Co.

Copper Expansion Joints
Wheeler Mfg. Co., C. H.

Copper Wire
Anaconda Copper Mining Co.
Copper Clad Steel Co.

Cord, Bell, Trolley, Register, etc.
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Roeblings Sons Co., John A.
Samson Cordage Works
Silver Lake Co.

Cord Connectors and Couplers
Electric Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car
Brill Co., The J. G.
Ohio Brass Co.
Van Dorn Coupler Co.
Westinghouse Trac. B. Co

Cranes
Niles-Bement-Pond Co.
Toledo Bridge & Crane Co., The
Whiting Corp.

Cross Arms. (See Brackets)

Crossing Foundations
International Steel Tie Co.

Crossings, Frogs and Switches
Wharton, Jr. & Co., Inc., Wm

Crossing Signals. (See Signals, Crossing)

Crossings, Track. (See Track, Special Work)

Culvert Pipe, Concrete
Massey Concrete Products Corp.

Culverts
Canton Culvert & Silo Co.
Stark Rolling Mill Co.

Curtains and Curtain Fixtures
Brill Co., The J. G.
Electric Service Supplies Co
Pantasote Co.

Cutouts
Chicago Fuse Mfg. Co.

Dealers' Machinery
Archer & Baldwin
Cleveland Armature Wks.
Electric Equipment Co.
Foster Co., L. B.
Griswold Machine Co., Geo M
Hyman Michaels Co.
Zelnicker Supply Co., Inc. Walter A.

Derailing Devices. (See also Track Work)
Cleveland Frog & Crossing Co

Destination Signs
Columbia M. W. & M. I. Co
Creaghead Eng. Co.
Electric Service Supplies Co

Detective Service
Wish Service P. Edward

Disconnecting Switches
Electrical Development Mach. Co.

Dogs, Lathe
Williams & Co., J. H.

Door Operating Devices
Consolidated Car Heating Co
National Pneumatic Co., Inc
Safety Car Devices Co.

Doors and Door Fixtures
Brill Co., The J. G.
General Electric Co.

Doors for Bus and Switch Compartments
Electrical Development Mach. Co.

Doors, Folding Vestibule
National Pneumatic Co., Inc

Draft Rigging. (See Couplers)

Drills, Rock
Chicago Pneumatic Tool Co.
Ingersoll-Rand Co.

Drills, Track
American Steel & Wire Co
Chicago Pneumatic Tool Co.
Electric Service Supplies Co
Niles-Bement-Pond Co.
Ohio Brass Co.

Drinking Cups, Sanitary Paper
Individual Drinking Cup Co., Inc

Dryers, Sand
Electric Service Supplies Co.
Zelnicker Supply Co., Walter A Inc.

Electrical Wires and Cables
Roebling's Sons Co., J. A

Electric Tools
Chicago Pneumatic Tool Co.

Engineers, Consulting, Contracting and Operating
Allison & Co., J. E.
Archbold-Brady Co.
Arnold Co., The
Byllesby & Co., H. M.
Clark Management Corp E. W
Day & Zimmermann, Inc.
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Chicago Pnuematic Tool Co.
Ingersoll-Rand Co.
Westinghouse Elec. & Mfg. Co.

Exhaust Gate Valves
Wheeler Mfg. Co., C. H.

Expansion Joints, Track
Wharton, Jr. & Co., Inc., Wm.

Fabricated Steel
Blaw-Knox Co.

Fare Boxes
Brill Co., The J. G.
Cleveland Fare Box Co.
Economy Electric Devices Co.
Johnson Fare Box Co.
National Railway Appliance Co.
Ohmer Fare Register Co.

Feed Water Heating
Schutte & Koerting Co.

Fences, Woven Wire and Fence Posts
American Steel & Wire Co.

Fenders and Wheel Guards
Brill Co., The J. G.
Cleveland Fare Box Co.
Consolidated Car Fender Co.
Electric Service Supplies Co.
Star Brass Works.

Fibre and Fibre Tubing
Continental Fibre Co.
Westinghouse Elec. & Mfg. Co.

Field Coils. (See Coils)

Filters, Water
Scaife & Sons Co., Wm. B.

Flaxlinum Insulation
National Railway Appliance Co.

Floodlights
Crouse-Hinds Co.
Electric Service Supplies Co.

Flooring Composition
American Mason Safety Tread Co.

Forgings
Carnegie Steel Co.
Columbia M. W. & M. I. Co.
Eureka Co.
Standard Steel Works Co.
Williams & Co., J. H.

Foundry Equipment
Whiting Corp.

Frogs, Track. (See Track Work)

Fuses and Fuse Boxes
Chicago Fuse Mfg. Co.
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.
Williams & Co., J. H.

Fuses, Refillable
Columbia M. W. & M. I. Co.
General Electric Co.

Gages, Oil and Water
Ohio Brass Co.

Gaskets
Power Specialty Co.
Westinghouse Traction Brake Co.

Gas-Electric Cars
General Electric Co.

Gas Producers
Westinghouse Elec. & Mfg. Co.

Gates, Car
Brill Co., The J. G.

Gear Blanks
Carnegie Steel Co.
Standard Steel Works Co.

Gear Cases
Columbia M W. & M. I. Co.
Electric Service Supplies Co.
Thayer & Co.
Westinghouse Elec. & Mfg. Co.

Gears and Pinions
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
National Railway Appliance Co.
Nuttall Co., R. D.
Tool Steel Gear & Pinion Co.

Generating Sets, Gas-Electric
General Electric Co.

Generators
English Electric Co., Ltd.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Grinders
Chicago Pneumatic Tool Co.

Grinders and Grinding Supplies
Indianapolis Switch & Frog Co.

Gongs. (See Bells and Gongs)

Grounding Boxes
Electrical Development Mach. Co.

Graphite
Morganite Brush Co.

Grates, Chain
Green Eng. Co.

Greases. (See Lubricants)

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Metal & Thermit Corp.
Railway Track-work Co.

Grinding Blocks and Wheels
Railway Track-work Co.

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Electric Service Supplies Co.
Ohio Brass Co.

Harps, Trolley
Anderson M. Co., A. & J. M.
Bayonet Trolley Harp Co.
Electric Service Supplies Co.
Hensley Trolley & Mfg. Co.
More-Jones B. & M. Co.
Nuttall Co., R. D.
Star Brass Works

Headlights
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
St. Louis Car Co.

Headlining
Pantasote Co.

Heaters, Car (Electric)
Consolidated Car Heating Co.
Economy Electric Devices Co.
Gold Car Heating & Lighting Co
National Railway Appliance Co
Smith Heater Co., Peter

Heaters, Car, Hot Air and Water
Cooper Heater Co.
Smith Heater Co., Peter

Heaters, Car (Stove)
Electric Service Supplies Co.
Smith Heater Co., Peter

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Chicago Pneumatic Tool Co.
Columbia M. W. & M. I. Co.
Ford-Chain Block Co.
Niles-Bement-Pond Co.
Yale & Towne Mfg. Co.

Hose
Chicago Pneumatic Tool Co.
Ingersoll-Rand Co.

Hose, Bridges
Ohio Brass Co.

Houses, Stations, Watchmen's, Concrete
Massey Concrete Products Corp.

Hydraulic Machinery
Niles-Bement-Pond Co.
Watson-Stillman Co.

Injectors
Schutte & Koerting Co.

Inspection
Electrical Testing Lab's

Instrument Cutout Switches
Electrical Development Mach. Co.

Instruments, Measuring, Testing and Recording
Economy Electric Devices Co.
General Electric Co.
Thompson-Levering Co.
Westinghouse Elec. & Mfg. Co.
Weston Elec'l Instrument Co.

Insulating Cloth, Paper and Tape
Anchor Webbing Co.
General Electric Co.
Hope Webbing Co.
Okonite Co., The
Westinghouse Elec. & Mfg. Co.

Insulating Machinery
American Insulating Machinery Co.

Insulating Materials, China and Porcelain
Jeffery-Dewitt Co.

Insulating Varnishes
Irvington Varnish & Insulator Co.

Insulation. (See also Paints)
Anderson M. Co., A. & J. M.
Drew Electric & Mfg. Co.
Electric Ry. Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Mitchell-Rand Mfg. Co.
Okonite Co., The
Westinghouse Elec. & Mfg. Co.

Insulators. (See also Line Material)
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Creaghead Engineering Co.
Drew Electric & Mfg. Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Macallen Co., The
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Insulator, China, Porcelain and Composition
Jeffery-Dewitt Co.

Insulator Pins
Electric Service Supplies Co.
Hubbard & Co.

Insulators, Section
Flood City Mfg. Co.

Inventions Developed & Perfected
Peters & Co., G. D.

Jacks. (See also Cranes, Hoists and Lifts)
Brill Co., The J. G.
Buckeye Jack Mfg. Co.
Buda Co.
Columbia M. W. & M. I. Co.
National Ry. Appliance Co.
Watson-Stillman Co.

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Carnegie Steel Co
Lackawanna Steel Co.
Rail Joint Co., The
Zelnicker Supply Company, Inc., Walter A.

Journal Boxes
Bemis Car Truck Co.
Brill Co., J. G.

Laboratories
Electric Testing Lab's

Lamp Guards and Fixtures
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Lamps, Arc and Incandescent. (See also Headlights)
Anderson M. Co., A. & J. M.
General Electric Co.
National Electric Specialty Co.
Westinghouse Elec. & Mfg. Co.

Lamps, Signal and Marker
Nichols-Lintern Co.
Ohio Brass Co.

Lathe Attachments
Williams & Co., J. B.

Lathes, Car Wheel
Niles-Bement-Pond Co.

Lightning Protection
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Line Material. (See also Brackets, Insulators, Wires, etc.)
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Archbold Brady Co.
Columbia M. W. & M. I. Co.
Creaghead Eng. Co.
Dossert & Co.
Drew Electric & Mfg. Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
English Electric Co., Ltd.
Eureka Co.
General Electric Co.
Hubbard & Co.
Macallen Co., The
More-Jones B. & M. Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Loaders, Wagon, Truck or Car
Portable Machinery Co.

Locking Spring Boxes
Wharton, Jr. & Co., Inc., Wm.

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Brill Co., The J. G.
General Electric Co.
McGuire-Cummings Mfg. Co.
Westinghouse Elec. & Mfg. Co.

Lubricating Engineers
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Texas Co., The
Universal Lubricating Co.

Lubricants, Oil and Grease
Borne, Scrymser Co.
Galena-Signal Oil Co.
Texas Co., The
Universal Lubricating Co.

Lumber. (See Poles, Ties, etc.)

Machine Tools
Columbia M. W. & M. I. Co.
Niles-Bement-Pond Co.
Watson-Stillman Co.

Magnetic Wire
Belden Mfg. Co.

Manganese Steel, Special Track Work
Wharton, Jr. & Co., Inc., Wm.

Meters, Car, Watt-Hour
Economy Electric Devices Co.

Meters. (See Instruments)
Electric Service Supplies Co.

Mica
Macallen Co., The

Mirrors for Motormen
Drew Elec. & Mfg. Co.

Molding—Metal
National Metal Molding Co.

Molded Insulations & Parts
Belden Mfg. Co.

Motor Leads
Dossert & Co.

Motormen's Seats
Electric Service Supplies Co.
Wood Co., Chas. N.

Motors, Electric
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Motor and Generator Sets
General Electric Co

Multiplex Atmospheric Relief Valves
Wheeler Mfg. Co., C. H.

Nuts and Bolts
Barbour-Stockwell Co.
Bemis Car Truck Co.
Columbia M. W. & M I. Co.
Hubbard & Co.
Lackawanna Steel Co.

Ohmmeters
Weston Elec'l Instrument Co.

Oil Burning Equipment
Schutte & Koerting Co.

Oils. (See Lubricants)

Oxy-Acetylene. (See Cutting Apparatus, Oxy-Acetylene)

Packing
Power Specialty Co.
Westinghouse Traction Brake Co.

Paints and Varnishes (Insulating)
Mitchell-Rand Mfg. Co.

Paints and Varnishes for Woodwork
National Ry. Appliance Co.

Panelboards
Crouse-Hinds Co.

Paving Material
American Brake Shoe & Fdry. Co.

Pickups, Trolley Wire
Electric Service Supplies Co.
Ohio Brass Co.

Pinion Pulleys
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
Wood Co., Chas. N.

Pinions. (See Gears)

Pins, Case Hardened, Wood and Iron
Bemis Car Truck Co.
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse Traction Brake Co.

Pipe
National Tube Co.

Pipe Fittings
Power Specialty Co.
Standard Steel Works Co.
Watson-Stillman Co.
Westinghouse Traction Brake Co.

Planers. (See Machine Tools)

Pliers, Insulated
Electric Service Supplies Co.

Plugs
National Metal Molding Co.

Pneumatic Tools
Chicago Pneumatic Tool Co.
Ingersoll-Rand Co.

Pole Reinforcing
Hubbard & Co.

Poles, Metal Street
Bates Expanded Steel Truss Co.
Electric Railway Equipment Co.
Hubbard & Co.

Pole Sleeves
Draw Elec. & Mfg. Co.

Poles, Ties Post, Piling & Lumber
Duncan Lumber Co.
Massey Concrete Products Corp.
Southern Cypress Mfgrs. Assn.

Poles, Trolley
Anderson Mfg. Co., A. & J. M.
Bayonet Trolley Harp Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
National Tube Co.
Nuttall Co., R. D.

Poles, Tubular Steel
Electric Railway Equipment Co
National Tube Co.

Porcelain Bushings
Electrical Development Mach. Co.

Portable Grinders
Buda Co.

Post Type Insulators
Electrical Development Mach. Co.

Potheads
Electrical Development Mach. Co.
Okonite Co., The

Power Saving Devices
Economy Electric Devices Co.
National Railway Appliance Co

Pressure Regulators
General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Protective Devices
Electrical Development Mach. Co.

Pumps
Schutte & Koerting Co.
Watson-Stillman Co.

Punches, Ticket
Bonney-Vehslage Tool Co.
International Register Co., The
Wood Co., Chas. N.

Punching Machinery
Watson-Stillman Co.

Purifiers, Feed Water
Scaife & Sons Co., Wm. B.

Rails
Foster & Co., L. B.
Lackawanna Steel Co.
Midvale Steel & Ordnance Co.

Rail Grinders. (See Grinders)

Rail Joint Plates
Lackawanna Steel Co.

Railway Safety Switches
Westinghouse Elec. & Mfg. Co.

Rail Welding. (See Welding Processes

Rails, Relaying
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Electric Service Supplies Co.
International Register Co., The
Ohmer Fare Register Co.
Rooke Automatic Register Co.

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American Steel & Wire Co.
Carnegie Steel Co.
Lackawanna Steel Co.

Repair Shop Appliances. (See also Coil Banding and Winding Machines)
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

Repair Work. (See also Coils)
Cleveland Armature Works
Columbia M. W. & M. I. Co.
General Electric Co.
Independent Lamp & Wire Co.
Westinghouse Elec. & Mfg. Co.

Replacers, Car
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Reading Specialties Co.

Resistance, Grid
Columbia M. W. & M. I. Co.

Resistance, Wire and Tube
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Retrievers, Trolley. See Catchers and Retrievers, Trolley)

Reverse Phase Relays
Electrical Development Mach. Co.

Rheostats
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Rivet Heaters
American Car & Fdry. Co.

Rosettes
National Metal Molding Co.

Rubber Covered Wire & Cables
Belden Mfg. Co.

Sanders, Track
Brill Co., The J. G.
Cleveland Armature Wks.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Nichols-Lintern Co.
Ohio Brass Co.
St. Louis Car Co.

Sash Fixtures, Car
Brill Co., The J. G.

Scrapers, Track. (See Cleaners and Scrapers, Track)

Seats, Car.. (See also Rattan)
Brill Co., The J. G.
Peters & Co., G. D.
St. Louis Car Co.

Second-Hand Equipment
Archer & Baldwin
Cleveland Fare Box Co.
Foster Co., L. B.
Griswold Machine Co., G. M.
Hyman Michaels Co.
Zelnicker Supply Co., Inc.. Walter A.

Shades, Vestibule
Brill Co., The J. G.

Shovels
Hubbard & Co.

Shovels, Power
Brill Co., The J. G.

Signals, Car Starting
Consolidated Car Heating Co.
Electric Service Supplies Co.
National Pneumatic Co., Inc.
Nichols-Lintern Co.

Signal Systems, Block
Electric Service Supplies Co.
Nachod Signal Co., Inc.
Union Switch & Signal Co.
U. S. Electric Signal Co.
Wood Co., Chas. N.

Signal Systems, Highway Crossing
Nachod Signal Co., Inc.
U. S. Electric Signal Co.

Slack Adjusters. (See Brake Adjusters)

Slag
Carnegie Steel Co.
Lackawanna Steel Co.

Sleet Wheels and Cutters
Anderson Mfg Co., A. & J. M.
Bayonet Trolley Harp Co.
Columbia M. W. & M. I. Co.
Drew Electric & Mfg. Co.
Electric Railway Equipment Co.
More-Jones Brass & Metal Co.
Nuttall Co., R. D.

Snow-Plows, Sweepers and Brooms
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Consolidated Car Fender Co.
McGuire-Cummings Mfg. Co.

Sockets & Receptacles
National Metal Molding Co.

Soldering and Brazing. (See Welding Processes and Apparatus.)

Special Adhesive Papers
Irvington Varnish & Insulator Co.

Speed Recorders, Locomotive and Car
Chicago Pneumatic Tool Co.

Spike Drivers, Portable Electric (screw spikes)
Chicago Pneumatic Tool Co.

Spikes
American Steel & Wire Co.
Lackawanna Steel Co.

Splicing Compounds
Westinghouse Elec. & Mfg. Co.

Splicing Sleeves. (See Clamps and Connectors)

Spray Nozzles
Schutte & Koerting Co.

Springs, Car and Truck
American Steel & Wire Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Fort Pitt Spring & Mfg. Co.
Standard Steel Works Co.
Taylor Electric Truck Co.

Sprinklers, Track and Road
Brill Co., The J. G.
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Irving Iron Works
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- Commutators
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- Third-rail shoe beams and accessories
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Eliminate Accidents

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cars and station steps.

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Car Heating and Ventilation

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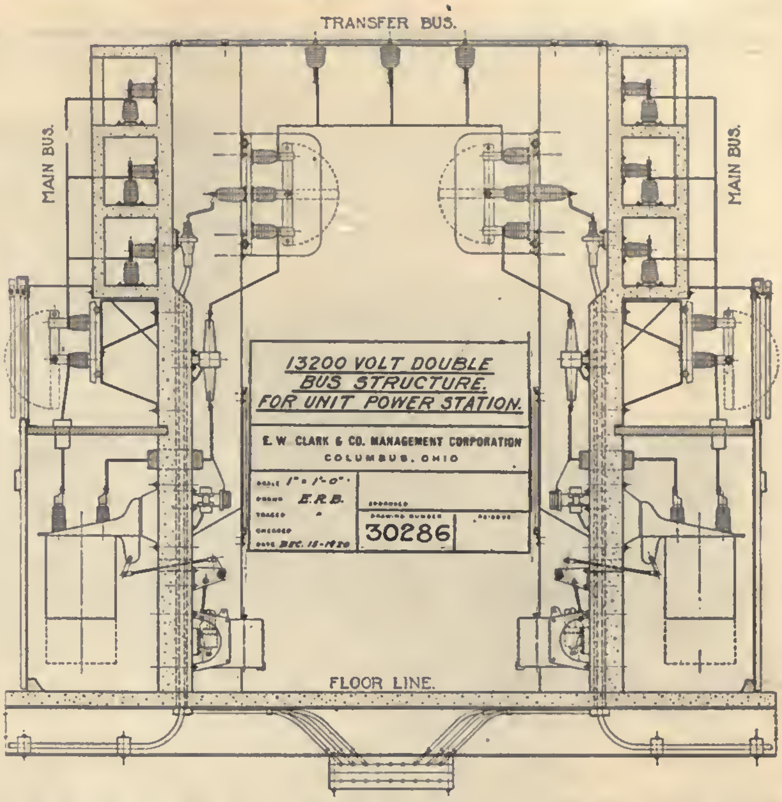
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MAIN BUS.
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E. W. CLARK & CO. MANAGEMENT CORPORATION
COLUMBUS, OHIO
1" = 1'-0"
E.R.B.
DEC. 15-1920
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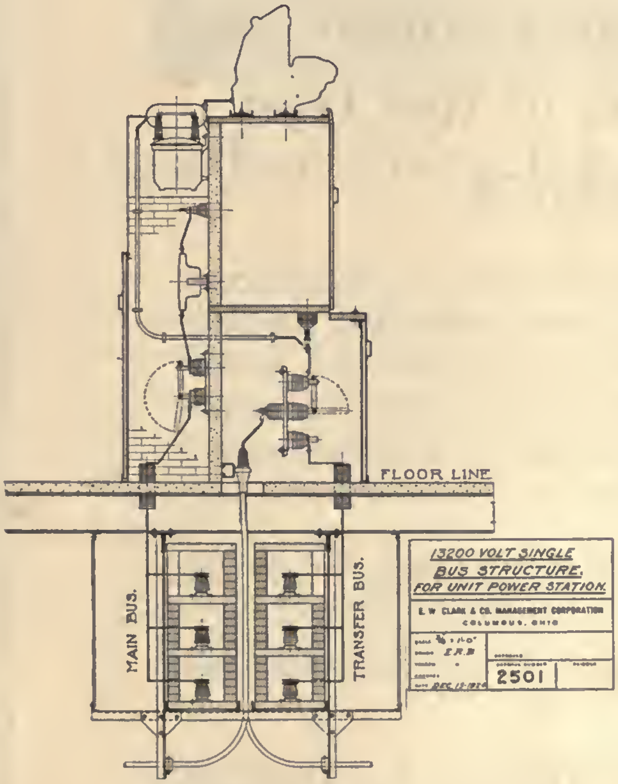
Without obligation or cost on your part, we would be glad to make preliminary recommendations on your problem. Write for Booklet A.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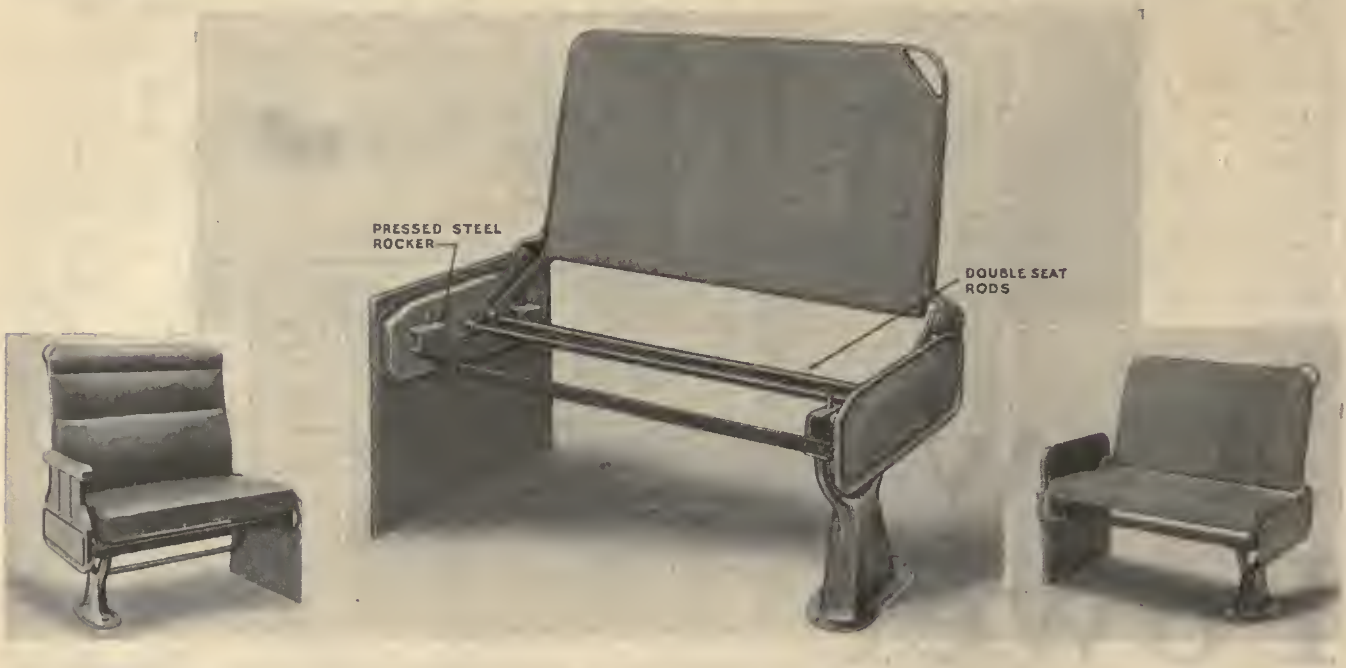
E. W. CLARK & CO. MANAGEMENT CORPORATION
COLUMBUS, OHIO
E.R.B.
2501

THIS type of bus and switch structure is designed for power systems of greater capacity or higher voltage than that shown above. It has all of the advantages of the design above but, in addition, the switches have a much greater rupturing capacity. This type of structure is applicable to large modern stations, especially where reactors are employed. It is especially useful where operation is to be restricted to one level.

E. W. Clark & Co. Management Corporation

Columbus, Ohio

Management, Engineering & Construction of Railway, Lighting & Power Properties.



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PHILADELPHIA, PA.

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Another Place for Birney Safety Cars

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During the "wee small hours" of the morning when patrons are homeward bound a more frequent schedule can also be operated at less total expense than any service with the heavier two-man cars.

Eliminate the long waiting for a night car by the installation of a more frequent Birney Safety Car Service. It is not only more economical, but will go far toward improved public relations.

Memo

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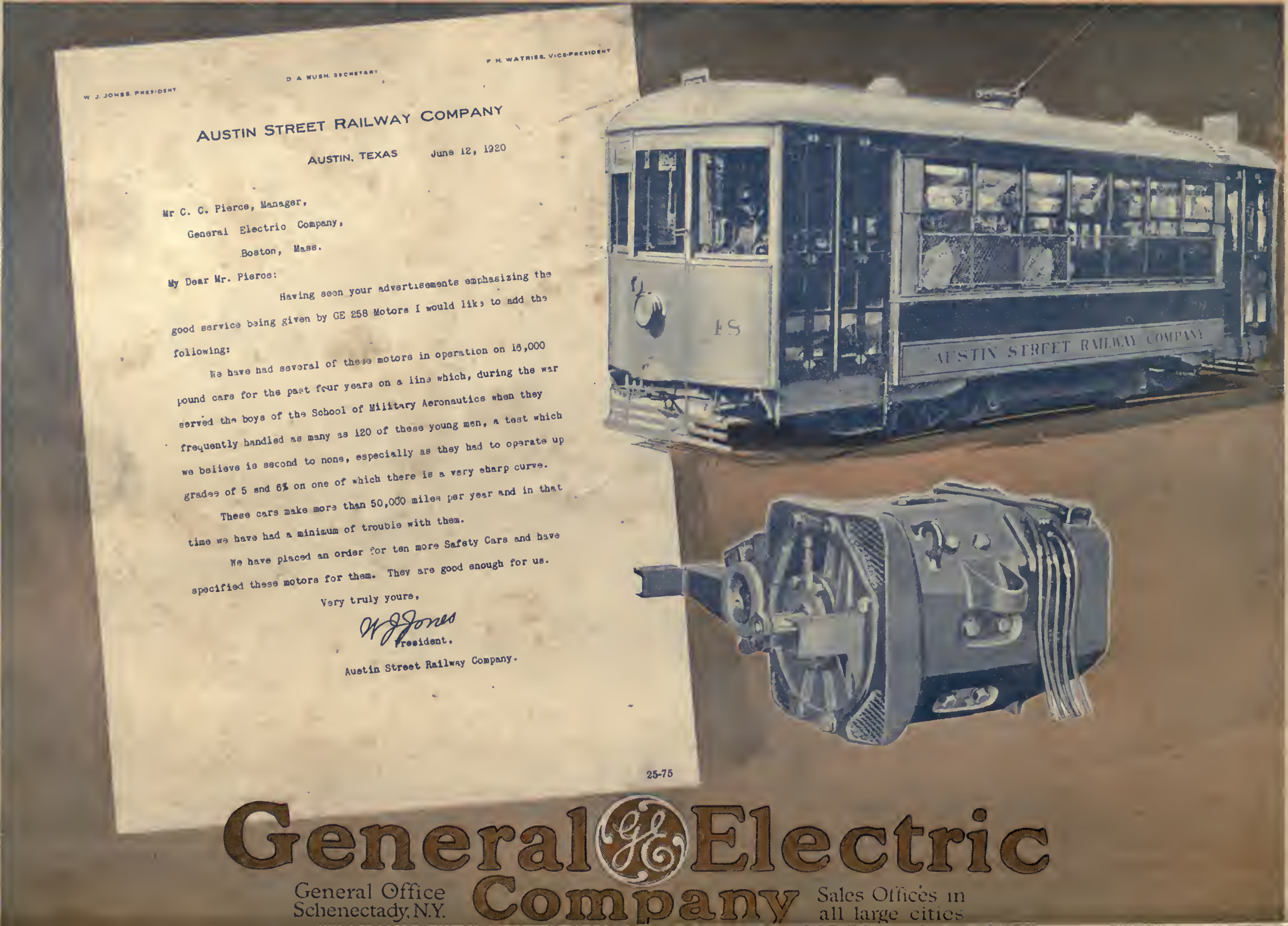

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AUSTIN STREET RAILWAY COMPANY

AUSTIN, TEXAS June 12, 1920

Mr C. C. Pierce, Manager,
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President.

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25-75

General Electric Company

General Office
Schenectady, N.Y.

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Farthest west,...Denver, Colo.

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Tie Track laid by more
companies every year.

The International Steel Tie Co.
Cleveland, O,

Mass Transportation

"Joe," said the Vice President, "I think the decision we made last week to order a two-car train with Westinghouse HL control and 514 motors was a very good one. I find that a large number of city properties around the country are planning similar studies. The only way to handle *Mass Transportation* in large congested centers is with two and three-car trains."

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"You're right about that," answered the Vice President. "The City authorities are just as interested as we in the transportation problem."

Westinghouse Electric & Manufacturing Co.

Sales Offices in All Large American Cities

East Pittsburgh, Pa.

Vol. 57, No. 2 New York, January 8, 1921 *Pages* 67-112

Electric Railway Journal

HENRY W. BLAKE and HAROLD V. BOZELL, Editors HENRY H. NORRIS, Managing Editor

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The Variable-Load Brake
—the Brake which automatically weighs its passengers and likewise adjusts Braking Power to make stopping distance the same with loaded, partly loaded and empty trains

8-car train on the Municipal Railway, New York City, fitted with Variable-Load Brakes.

The high speed and short headway of subway trains in the densely populated metropolitan cities call for the most efficient braking facilities possible.

Safety of passengers demand that shortest possible stops be assured; and the short headway of trains, as determined by the block signal spacing, requires that the stopping distance of trains, whether loaded, partly loaded, or empty, be uniformly the same.

These requirements are fully met by the Variable-Load Brake, whose prime and unusual characteristic is that passengers upon entering and alighting from the car, unknowingly set in operation certain automatic mechanism which varies the braking force to suit the increased or decreased load, as the case may be.

Thus short and uniform stopping distance, as prescribed and limited by the close block signal spacing, is assured.

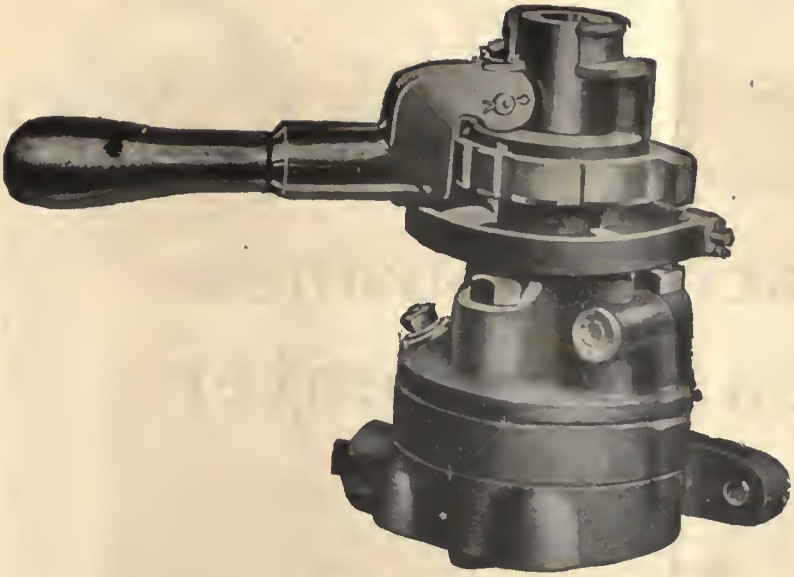
Westinghouse Traction Brake Company

General Offices: Pittsburgh, Pa.
Works: Wilmerding, Pa.

New York
San Francisco

Washington

Chicago
St. Louis



Air Brake and Safety Car Control Equipment

Better Service Under All Traffic Conditions

A writer for a metropolitan daily says this of Safety Cars:

"When cars operate through a thinly populated section the conductor has little or nothing to do which the motorman could not do as well. On such lines no good reason has been found why the company should not use one man cars."

This man was partly right and partly wrong. The "company" *should* use one man Safety Cars but their application should not be limited to "thinly populated sections." They are equally efficient in congested districts and insure *better service* under *all* traffic conditions.

But remember—it is a Safety Car only when equipped with automatic, laborless apparatus, so interlocked that, regardless of the illness or distraction of the operator, the power will be cut off instantaneously, the air brakes and sander apply immediately thereafter and the doors unlock for safe and easy exit. Furthermore, it is a Safety Car only when the doors must be closed before the car can start, and when the air brake must be applied before the doors are opened and the step lowered in bringing the car to a service stop.

SAFETY CAR DEVICES COMPANY

Main Office—Boatmen's Bank Bldg., ST. LOUIS, MO.

CHICAGO	WASHINGTON, D. C.	NEW YORK	PITTSBURGH	SAN FRANCISCO
Railway Exchange Bldg.	Munsey Bldg.	City Investment Bldg.	Westinghouse Bldg.	Southern Pacific Bldg.

CANADA—Canadian Westinghouse Co., Ltd., Hamilton, Ont.

Phono-Electric

For a Tacoma Business and Pleasure Center

During the busy day the Tacomans resort here for business; in the evening for pleasure.

So Ninth Street and Broadway is a busy center at all times with plenty of car movement — more than ever in fact since the shorter-headway safety car came along.

Naturally, an intersection like this is put up with Phono-Electric Trolley Wire, because The Tacoma Railway and Power Company wanted a wire that would stay put and stay up.

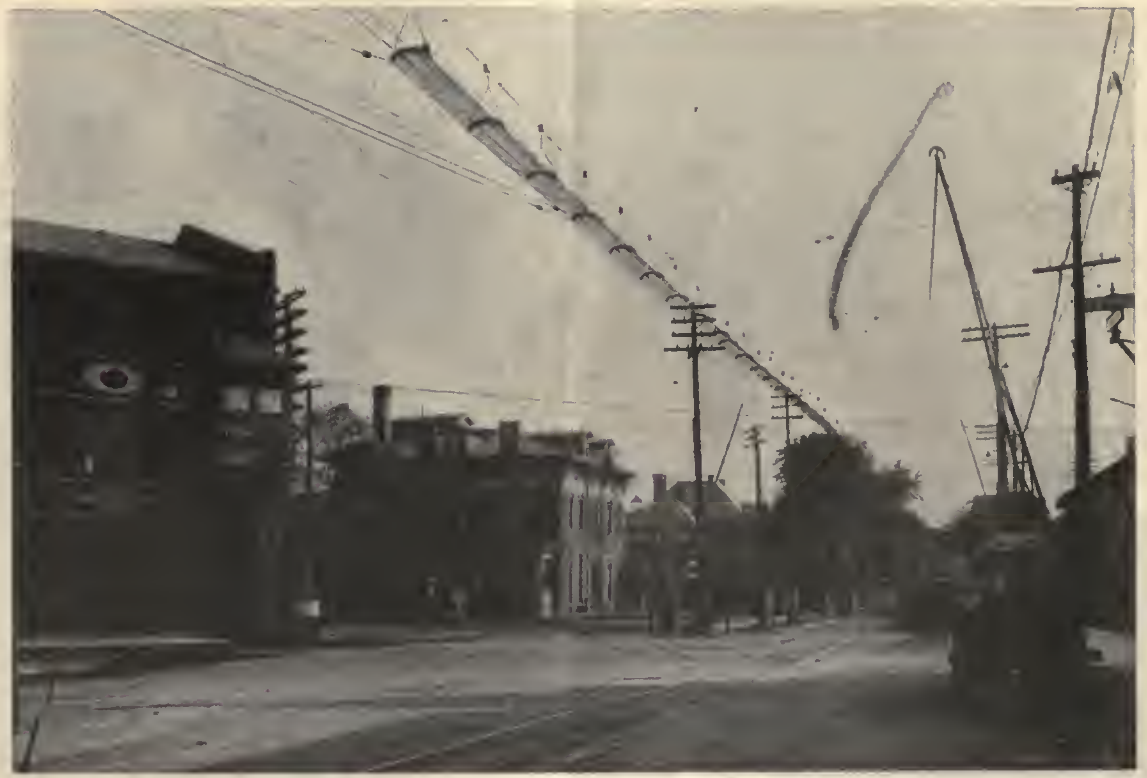
Phono-Electric does!

Bridgeport Brass Company

Bridgeport Connecticut

PRODUCTS

Quality First



NATIONAL TROLLEY GUARD

The Ounce of Prevention

A grade crossing is a most likely, and the most dangerous place for the trolley to jump. There is no "cure" for grade crossing accidents after they have happened. But National Trolley Guard will prevent a car stalling on the track due to a wild trolley.

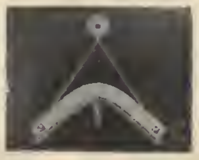
It is a trough made of wire mesh and inverted over the trolley wire. When the wheel jumps it runs on the guard which furnishes power to carry the car to safety.

National Guard is far less expensive than its protection warrants.

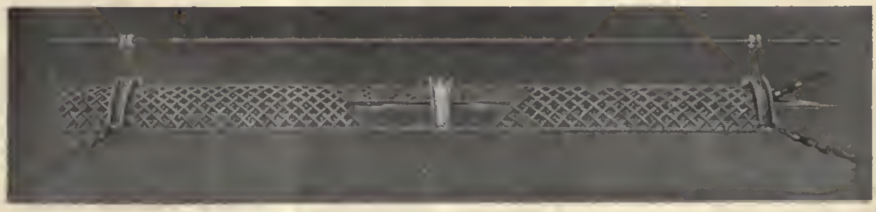
Because it is made of open wire mesh it is not seriously troubled by ice, snow, wind or locomotive exhaust. It is not hard to install and it is durable.

Send for "Guarding the Grade Crossings."

THE OHIO BRASS COMPANY, Mansfield, Ohio



End View Single Trolley



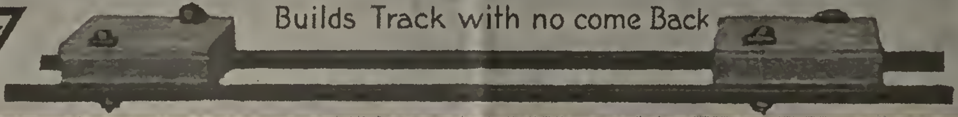
Side View Single Trolley (also made for Double Trolley)

The RESILIENT RAILWAY TIE

DMTC

Builds Track with no come Back

DMTC



Reclamation vs. Reconstruction

Are you worrying about the thousands which must be spent for track reconstruction on your property next spring, because the joints are bad?

The Dayton Joint Booster

will, in nine cases out of ten, provide the remedy and postpone this large outlay of money for reconstruction for several years.

The track pictured here was considered beyond repair, but was reclaimed with Dayton Joint Boosters for less than one year's interest on the cost of new work. And there was no interruption to traffic.

Can you afford to pass by an opportunity of this kind, when the Booster costs only *four dollars and fifty cents?*

THE DAYTON MECHANICAL TIE CO., 704 COMMERCIAL BUILDING, DAYTON, OHIC

WRITE

"Keystone Specialties"
ON YOUR ORDER FOR SAFETY CARS

Signs, headlights, catchers, sanders, car signal systems, gongs and gear cases—all equipment which is of utmost importance in the building of a safety car.

The fact that these specialties used on the standard Birney Safety Car were chosen from the line of Keystone Car Specialties is a point for you to remember when buying safety cars.

Our Bulletin No. 167 shows many other specialties for use on safety cars—equipment which has been proven good and economical to buy.

Write for complete data.

ELECTRIC SERVICE SUPPLIES CO.

Manufacturer of Railway Material and Electrical Supplies

PHILADELPHIA: 17th and Cambria Streets NEW YORK: 50 Church St. CHICAGO: Monadnock Building

Canadian Distributors: Lyman Tube & Supply Co., Ltd., Montreal, Toronto

Keystone-Hunter Car Signs

Gniden Glow Headlights

Keystone Rotary Gongs

Keystone Steel Gear Cases

Keystone Trolley Catchers

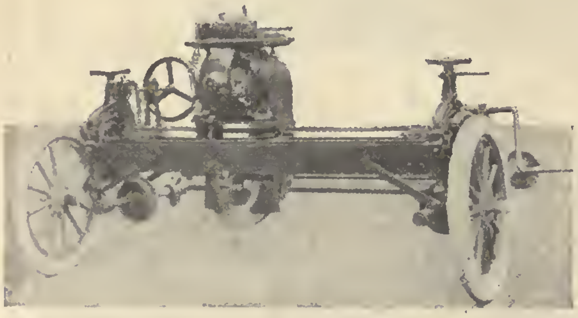
Keystone Air Sanders

Faraday Car Signal System

How Many Lives Has a Rail?

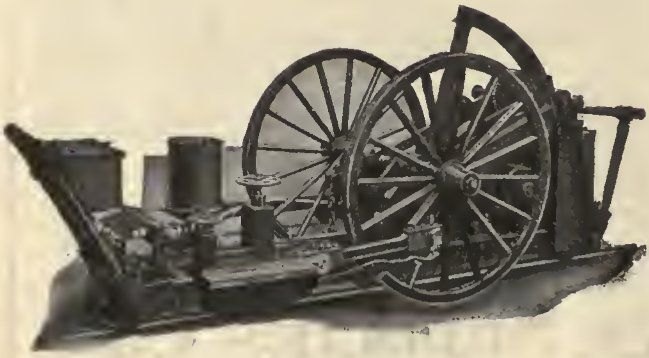
Not more than one, unless you have a

Rotary or Reciprocating Track Grinder



and then it has two, as hundreds of electric railways throughout the country can truthfully vouch for.

When cupping, corrugations or indentations capture your track, that's the end of the rail's first life.



But when taken out with the Reciprocating Track Grinder, or the built-up joints ground down by either the Atlas or Universal Track Grinders, the same rail is good for another life of 15 to 40 per cent of its first life.

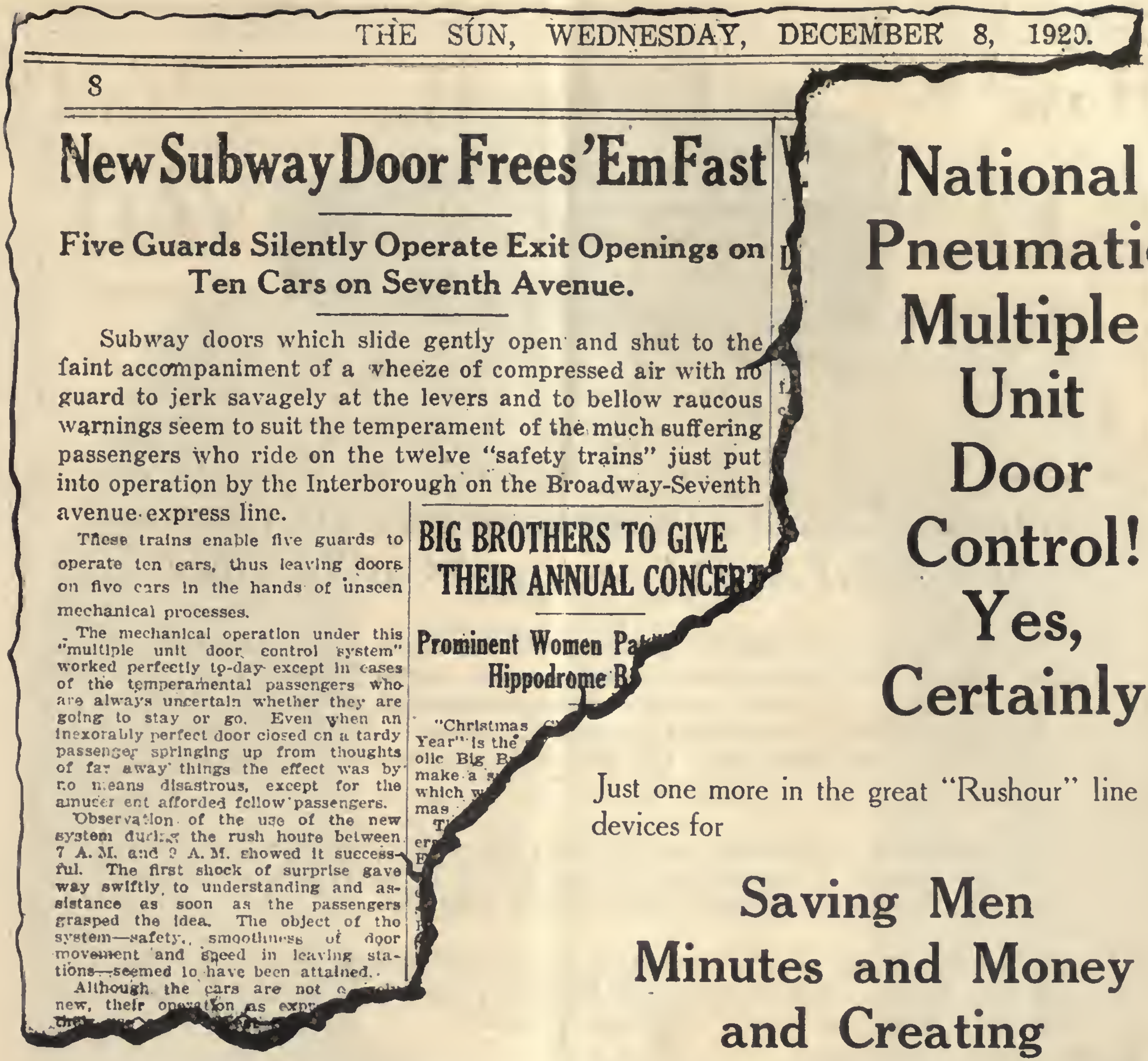
Bad track conditions never cure themselves. They just keep on getting worse, unless they are taken in hand vigorously and given thorough treatment.

And the worse they get the more expensive they are to remedy when the remedy is eventually applied.

Your solution lies in the continued use of one of these three track grinders. Let us prove it to you.

Railway Track-work Co.

3132-48 East Thompson St., Philadelphia, Pa.



THE SUN, WEDNESDAY, DECEMBER 8, 1920.

8

New Subway Door Frees 'Em Fast

Five Guards Silently Operate Exit Openings on Ten Cars on Seventh Avenue.

Subway doors which slide gently open and shut to the faint accompaniment of a wheeze of compressed air with no guard to jerk savagely at the levers and to bellow raucous warnings seem to suit the temperament of the much suffering passengers who ride on the twelve "safety trains" just put into operation by the Interborough on the Broadway-Seventh avenue express line.

These trains enable five guards to operate ten cars, thus leaving doors on five cars in the hands of unseen mechanical processes.

The mechanical operation under this "multiple unit door control system" worked perfectly to-day except in cases of the temperamental passengers who are always uncertain whether they are going to stay or go. Even when an inexorably perfect door closed on a tardy passenger springing up from thoughts of far away things the effect was by no means disastrous, except for the amusement afforded fellow passengers.

Observation of the use of the new system during the rush hours between 7 A. M. and 9 A. M. showed it successful. The first shock of surprise gave way swiftly to understanding and assistance as soon as the passengers grasped the idea. The object of the system—safety, smoothness of door movement and speed in leaving stations—seemed to have been attained.

Although the cars are not
new, their operation as exp

BIG BROTHERS TO GIVE THEIR ANNUAL CONCER

Prominent Women Pa
Hippodrome B

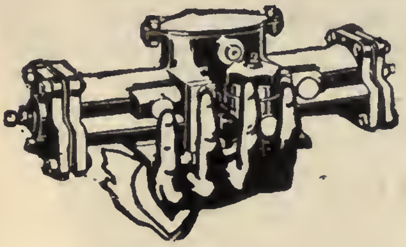
"Christmas
Year'' is the
olic Big B
make a
which
mas

National Pneumatic Multiple Unit Door Control! Yes, Certainly.

Just one more in the great "Rushour" line of devices for

Saving Men Minutes and Money and Creating Good-will and Business

Ask us about any of 'em—Pneumatic Door and Step Control, Door and Step Operating Mechanisms, Motorman's Signal Lights, Safety Interlocking Door Control, Multiple Unit Door Control.



National Pneumatic

Door and Step Control
Motorman's Signal Lights
Safety Interlocking Door Control

National Pneumatic Company, Inc.

50 Church St., New York
Edison Bldg., Chicago
Works: Rahway, N. J.

Manufactured in Canada by
Dominion Wheel & Foundries, Ltd., Toronto, Ont.

Why the Leading Manufacturers and Operators use SURPACO Coach and Car Surfacer

The chief virtue of SURPACO Surfacer, for coaches and cars, is the particular tenacity of the priming coat—it makes a firm, lasting bond with wood or steel surfaces and forms a most durable groundwork on which to build successive surfacing and finishing coats. SURPACO Surfacer completely fills up all rough places, bolt and nail holes, and provides the smoothest possible surface for finishing work.

It is adaptable to both old and new work and will be furnished to match any color desired. Can be completely applied in 8, 11 and 14 days, according to the system which particular cases find most desirable.

SURPACO Coach and Car Surfacer is a product that fully equals the high quality mark to which all kindred SURPACO products are held, and it will certainly be to your benefit to learn more about it.

Ask us for further particulars, with color cards and directions for our widely used 8-, 11- and 14-day systems. Or, if you have special problems to solve, put them before our Engineering and Advisory Department. Their experience is very valuable—their services cost you nothing.

St. Louis Surfacer & Paint Co.
Hazel and Union Aves.
St. Louis, U. S. A.

Paints for Large Corporation Users Only

START RIGHT WITH SURPACO

DAVIS STEEL WHEELS

Maximum Service—Minimum Maintenance Costs

Wheel removal costs and costs of turning are always supplemented by the following labor charges. (1) Cost of reapplying wheels to equipment, (2) cost of renewing or reclaiming journal brasses, (3) cost of replacing bolts and nuts every time wheels are changed, (4) cost of shimming cars to maintain coupler heights. The one-wear feature of Davis Steel Wheels eliminates all of these labor charges.

American Steel Foundries

1100 McCormick Building, Chicago

Collier Service

Co-operation with the Advertiser is also Co-operation with You

There are a dozen ways to skimp on the quality car-card publicity if we wanted to skimp—as in design, grade of paper and ink, frequency of change, timeliness of subject advertised, merchandise data, so on.

But the fact that Collier Service cars are notable for the large proportion of experienced national advertisers proves that these advertisers realize that they are getting real co-operation in selling their product.

Because of this co-operation their confidence in car-card advertising has remained undiminished despite the enormous development of other forms of advertising since Collier Service was originated.

That is where our co-operation with *you* comes in—for it is the advertiser's confidence in Collier Service that keeps car-card advertising a source of permanent revenue to the electric railway.

Barron G. Collier
INCORPORATED
Candler Building, New York

MERITAS LEATHER CLOTH

Best for Public Service

The sanitary and wear-resisting characteristics of Meritas Leather Cloth make it pre-eminently suitable for the upholstering of seats in street cars and railroad coaches and for Window shades.

Its rich leather-like surface is not easily marred by the scuffling of feet; is not affected by moisture, dirt, stain, vermin, or sticky fingers, and may, if necessary, be cleaned with water.

The foundation fabric used in Meritas Leather Cloth is woven in our own Southern Cotton Mills from the best long staple cotton and every process of production is carefully controlled in a group of our own manufacturing plants, closely supervised by skilled specialists.

Meritas Leather Cloth is produced in every weight, grain, color and finish that could be desired for car seat upholstery and for window shades.

Let us send you samples.

THE STANDARD TEXTILE PRODUCTS CO.
320 BROADWAY, NEW YORK
DEPT. E. R. J.

MERITAS STANDARD STP TEXTILE PRODUCTS BRAND

What does the public want, anyway?

There's a lot of talk these days about "fostering public good will," "creating a better understanding between carriers and public, etc."

Which leads us to wonder if we aren't making a mountain out of a mole hill in trying to solve that seemingly unsolvable problem of how to secure cooperation between the electric railway and the people that use them.

After it's all boiled down, about all the public wants, is to move quickly, safely and comfortably from one part of the city to another.

Seems simple, doesn't it? The thing to do, then, is to employ every possible means of speeding up schedules and insuring greater safety and comfort for passengers.

Records on file in the offices of hundreds of progressive Electric Railways prove that Johnson Fare Boxes accomplish all these things.

And best of all, their use *increases your revenues from* 3 *to* 10%. Isn't it worth investigating? Write today for all the facts.

JOHNSON FARE BOX COMPANY

Ravenswood, Chicago, Ill.

The World's best Lubricants

QUALITY G A L E N A

GALENA -OILS-

"The right oil in the right place"

GALENA SERVICE

For over a quarter century the slogan of our Mechanical Experts—the maxim representing the foundation of *Galena Service.* Lubrication must be considered from two view points: the first is the selection of the lubricants and the second, its proper and continuous application to bearings, in the amount required.

TRIGRAM G S O C TRADE MARK

Galena Oils

stand on performance and not on claim. They need no brief to establish a reputation as "right" oils. In daily use on hundreds of steam and electric railways, they are today—as for many years past—the accepted quality standard for railway lubrication. They prove their worth by giving extra service and standing strains of railway work without a break. There is a tested and reliable Galena product for every class of electric railway work.

Galena Service

has become such an indispensable ally to the operating departments of railroads that it is now represented in every part of the country. It brings the personal help and co-operation of mechanical men—trained specialists in Galena scientific lubrication methods—that assures the correct application of the right lubricants and the elimination of the annoying and expensive troubles due to improper lubrication.

Galena Lubrication Service is working at the top-notch of efficiency. It has gained the unqualified endorsement of representative railway officials—and the sincere flattery of imitation by oil concerns, which, of course, means a general recognition of its worth and ability.

THE GALENA-SIGNAL OIL CO.

NEW YORK FRANKLIN, PA. CHICAGO

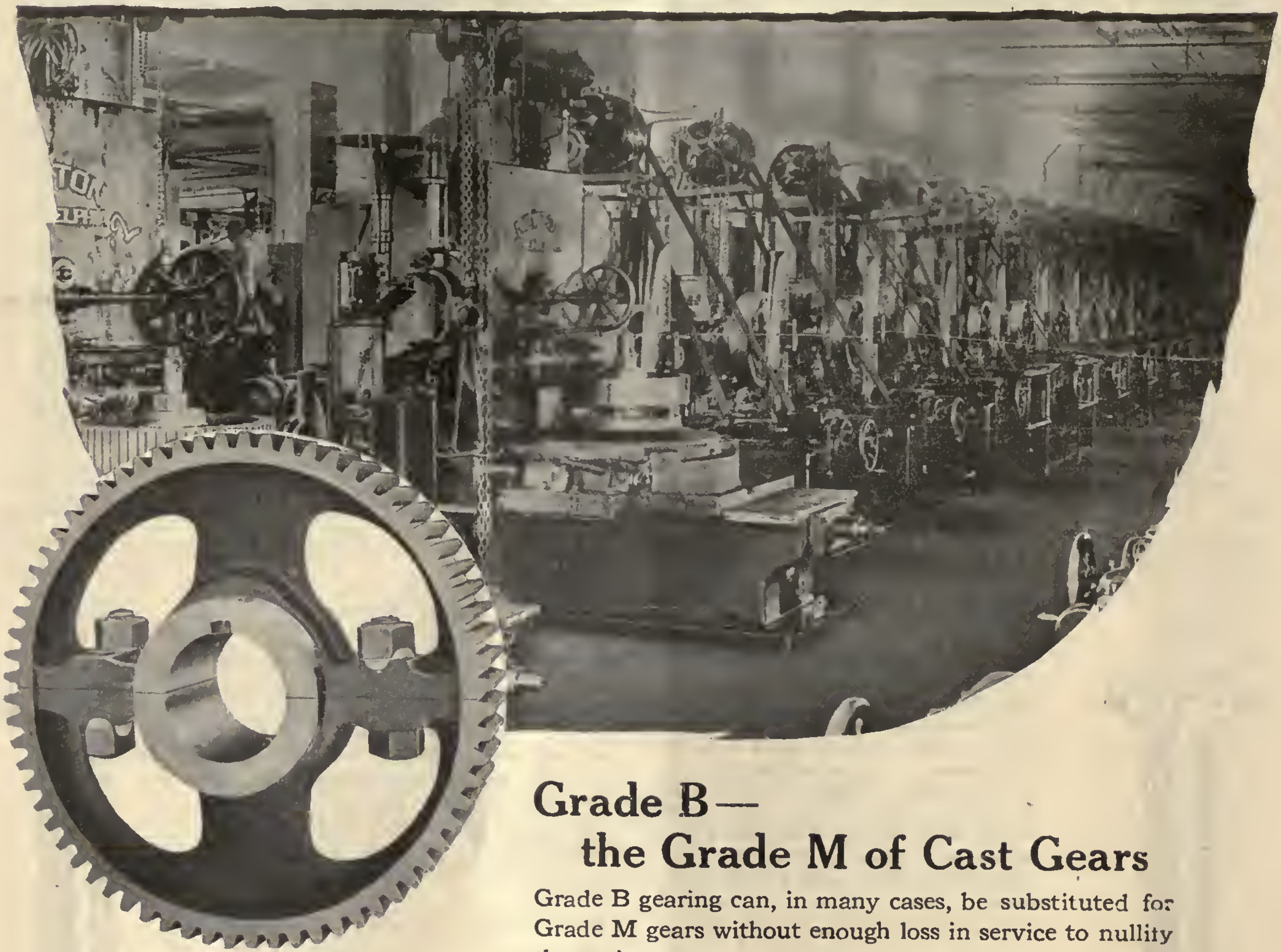
Offices in all principal American Cities

LONDON BUENOS AIRES PARIS

GALENA SERVICE

GALENA SERVICE

When less costly material can be substituted, without a prohibitive decrease in service obtained, a worth while economy has been accomplished.



Grade B—
the Grade M of Cast Gears

Grade B gearing can, in many cases, be substituted for Grade M gears without enough loss in service to nullify the saving.

A steel casting forms the basis of Grade B and this enables the manufacture of the split type of gear, impossible with a forging. Grade B blanks are so carefully inspected that only such are used as are entirely free from sand or blow-holes.

Grade B gears receive practically the same heat treatment as the famous Grade M, which insures a product so nearly equal to the forged gear as to serve as a satisfactory substitute on all but the heaviest duty. Grade B is our most durable grade of cast gear.

Why not try them on your lines?

General Electric Company

General Office
Schenectady, N.Y.

Sales Offices in
all large cities

40-135

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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HARRY L. BROWN, Western Editor N. A. BOWERS, Pacific Coast Editor H. S. KNOWLTON, New England Editor C. W. SQUIER, Associate Editor C. W. STOCKS, Associate Editor
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C. J. MACMURRAY, News Editor W. R. ANDERSON, Assistant News Editor

Volume 57 New York, Saturday, January 8, 1921 *Number* 2

Fare Changes and Conductors' Morale

THE maintenance of good public relations is desirable for many reasons, but one to which attention has not often been directed is that of the effect of good public relations on the morale of the operating force. In those cities where the management and the company are generally considered to be doing the right thing and the railway system is regarded with pride by the community it is but natural that the operating force should reflect this condition by taking a pride in its work. Where the contrary is true, however, it is obvious that the operating force will respond also to this situation, particularly as the men on the cars are the recipients of the greater part of the complaints.

For this reason sources of irritation in the service which are not matters of principle should be avoided wherever possible.

One common cause for complaint with zone systems on an intercommunity line where the zones are on a distance basis is to have the fare limit occur at a point across which there is at times much over-riding in one direction or the other for a few hundred feet or so. Discontent is more apt to be enhanced in a case of this kind, of course, where there has been a recent change in fares. In such cases it will usually be found desirable for the company so to place its zone limits that they fall as far as possible between community limits rather than within them. If this is done it obviates discrimination of passengers that live close to the zone line, adds very much to the maintenance of good public relations with the inhabitants of that district and is likely to increase car revenues.

Suggestions as to what constitute such causes of irritation can often be obtained to advantage directly from the men themselves. They are the ones who receive the complaints and can often give a new fare plan or even an old fare plan both destructive and constructive criticism.

Have You an Adequate Program of Publicity?

PUBLICITY, or advertising as it might more properly be called, is a natural and accepted feature of ordinary business. It has been a feature of the electric railway business, but there is a continuous complaint, may it be said, that the industry is not "getting anywhere" fast enough with the present program. There is a call for more education of the public.

Passing for the present the question of national publicity, what is being done by the various companies locally? Some are carrying on most successful work in this line and the "copy" produced is often most attractive and carries suggestions for use elsewhere. The ELECTRIC RAILWAY JOURNAL is trying to reproduce as much of the good material as it can.

There are two suggestions which might be made as criteria for the coming year, both of which are in use by some companies.

One of these is the suggestion that each railway spend for advertising that revenue which it receives from advertising, from car cards, station posters, etc. It is a legitimate business expenditure, as necessary with electric railways as with other lines of commercial and industrial activity. The electric railway business is a selling business. Over 12,000,000,000 individual sales are made each year, which should amount in 1921 to approximately $750,000,000. Any other industry with such a business would advertise!

The other suggestion is that publicity and information material be so worded that it will leave a question in the mind of the reader, a question of such a nature that he sees that the subject affects his own interests and he will want to answer it. One criticism of much railway publicity matter now is that it is too much like spoon feeding, too much of mere information, all matter of fact, sealed and delivered. Excite the reader's curiosity! Excite his own self-interest! Ask him questions! President Gadsden strikes a good note with his "Ask the Car Rider" slogan, which can well be capitalized in advertising to the riding public.

Above all, have a plan, study the other fellow's work, exchange information and use advertising to sell your product—transportation.

Get a Sales Manager and Put Him to Work

AS THE foregoing figures commence to permeate one's consciousness, there is also the inclination to ask what other business with 12,000,000,000 sales annually, or with a gross sales income of $750,000,000, has no sales management? How some real salesmen would jump at an opportunity where there are already billions of purchasers and where there are other billions of potential customers in the pedestrians, auto riders, stay-at-homes, etc.!

Many companies have done a good deal, when operating and financial problems were temporarily not too pressing, to "merchandise transportation," but usually this has been only when other problems didn't press. This work has devolved, from time to time, on the superintendent of transportation, on the public relations representative, or some one else temporarily available. What is needed is a sales manager.

A sales manager is primarily, and solely, a salesman and an organizer of salesmen. He ought to have no other duties than to sell rides and to "sell" the idea of the value of a ride. He ought to be a salesman who has been taught the railway game; a salesman first, a railway man second. Most often, railways try to train a railway man to be a salesman. If he has a salesman's instinct, all right, but usually he remains an operator.

Moral: Get a sales manager and sell more rides.

Sloughing Off Detail in Administrative Work

EVERY man who has any executive responsibility finds his time taken up with two distinct types of duties; one covering the broad general principles of his business, the other details largely of a clerical nature. In spite of resolve to the contrary, duties of the second type are apt to take a disproportionate share of attention, partly because they are more tangible and seem to be closer at hand, and partly because it is for most people easier to work with the hands than the head. But executives are paid to work with the head rather than the hands, and if they are to be permanently successful they must turn over to others all duties that the others can perform.

This line of thought has been suggested by editorial calls upon hundreds of electric railway executives, from foremen up. Possibly it is too much to say that most of these men are being hampered by too close attention to detail, but certainly many are. And their departments as well as properties as a whole reflect the influence of undue absorption of the executives in things rather than ideas.

If manufacturers used for any purpose material unnecessarily expensive, the wastefulness of the practice would be obvious. The same principle holds, of course, in the personnel of an organization, although it may perhaps not be so easily detected. One factor in the efficient conduct of every business, therefore, is so to assign the work that expensive men will not be engaged on things which others at lower salaries can do just as well. Another advantage of this plan is that it will usually develop the assistants to take positions of greater responsibility as time goes on.

Nothing Venture, Nothing Win

THE carefree way in which the London County Council Tramways, and later the London General Omnibus Company, could announce so far reaching a change as a reduced off-peak fare, or one good from 10 a.m. to 4 p.m., in the largest city of the world calls for admiration at their courage quite regardless of the economic value of an experiment that has been in force since May, 1920, on the entire tramway system, and since Sept. 27, 1920, on the motor bus lines. With all the enterprise that is associated with the adjective "American" the railway industry as a whole has often been most timid about adopting innovations which later proved their worth.

Thus even the youngest electric railway men today can recall the general belief that there was no better way of collecting fares than that of having a conductor work his way through the car while the then open rear platform remained unguarded. Many had suggested pay-as-you-enter before MacDonald and Ross, but it remained for them as daring operators to prove that the public would appreciate its superiority. This is history known to all. Less known is the fact that W. S. Twining, then chief engineer of the Philadelphia Rapid Transit Company and now Philadelphia's Director of City Transit, designed a pay-leave car as early as 1907 (see *Street Railway Journal,* Jan. 18, 1908). Apparently the idea made no appeal to the then Philadelphia management, nor did the average operator believe that it would be as practicable or desirable to get the fare after the ride was taken rather than before. It conjured up in his mind visions of people leaving cars en masse during a blockade and refusing to pay any fare even after a long ride.

Mr. Twining was simply ahead of the group imagination of his day, for after Peter Witt, as Street Railway Commissioner of Cleveland, had persuaded the Cleveland Electric Railway in 1911 to try several types of pay-leave cars, the idea took hold and made good in a large number of cities. The honest belief of many operators that their patrons would be unalterably opposed to modern one-man car operation is too fresh in memory to require recalling.

Knowledge of these incidents in the history of the industry should drive groundless fears out of the heart of the operator who wants to try something new in the way of equipment or fares practice. He may rest assured that if his idea holds something of worth to his patrons they will put up with the inconvenience involved in the change, provided always that his plan and motives receive due publicity.

Do the Electric Railways Need Any More Technical Graduates?

AT THIS time of the year the prospective five thousand graduates, more or less, of a hundred technical schools are beginning to wonder what they are going to do after commencement. Already the manufacturing and some other industries are planning to send representatives to the colleges to explain to the young men, and young women too in some cases, the attractions of their several fields of activity. The electric railways will not be so represented. This is partly because there is no central organization for the electric railways which takes up matters of this kind, and individual railways do not need enough men to warrant them in going to the expense of sending "scouts" to the colleges. It is doubtful, also, if the value of a technical education applied to the right kind of an individual is appreciated as much by the railways as in manufacturing. Possibly the value is actually higher in the latter field, but this ought not to be so.

At any rate, the manufacturers and a few others will get the choice of the educational crop and the railways will take what is left, including, however, those young men who have heard the "call of the rail" and will insist on going into transportation work in spite of lack of invitation and even, if necessary, of opposition. Luckily, this number is considerable.

There are many excellent opportunities for technical graduates in the electric railway and related fields. The whole business is founded upon civil, mechanical and electrical engineering. Of course, the focus of interest has shifted somewhat in recent years from track, power plant and line to fares, schedules, accident reduction, etc. But fundamentally transportation is a proposition of moving people and goods from one point to another with a maximum of speed, economy and safety. As long as this is so the business will need engineers.

Furthermore, the principles underlying engineering have application far outside the engineering divisions of the field and engineers are making themselves useful in the transportation, purchasing, accounting and other departments. They are especially useful in the making of appraisals, either in the railway organization or without, a phase of the work which is bound to become more and more important.

It is too bad that some systematic way has not been provided by which the electric railway field can be explained to engineering students. Some schools have courses in transportation engineering, which serve an excellent purpose, but they need to be supplemented by talks from competent railway executives or their representatives. This would seem to be a line of work for the American Electric Railway Association and American Railway Association to take up on behalf of their respective clienteles.

Refunding Is a Problem in the Face of Present Tax Exemptions and Income Tax Laws

ONE of the big financial problems in the electric railway field during 1921 is how bond issues maturing this year will be refunded. The topic is one which is to be considered at length at the mid-year meeting of the American Electric Railway Association and the thought here is not to anticipate the subject as presented at that meeting but to give a few figures to emphasize the importance of the topic to the electric railways and the communities which they serve.

According to the census report in 1917, there was in that year outstanding in funded debt $3,068,377,167 on which the annual interest paid was $110,506,977. If twenty years is assumed as the average life for these bonds, those maturing each year would aggregate about $150,000,000; this average would be reduced to about $100,000,000 if a thirty-year average life of bond was assumed. Actually, the figures would not be quite so large as these, since the companies in the hands of receivers may be considered as being relieved of the necessity of caring for their maturing issues. Practically 15 per cent of the funded debt of the electric railways mentioned above was issued by companies now in receivers' hands.

It is obvious that all refunding issues of bonds issued now will have to carry interest rates much higher, to make them sell at par, than those bonds whose place they take. Most of the earlier bonds were put out at a time when the common interest rate for the average utility bond was 5 per cent. Some of the longer seasoned issues bore only 4 per cent interest. Now, when government bonds with many tax exemption features sell on a basis of from 5.20 per cent for the longest term to 6.40 per cent for the 1928 maturity, it is easy to see that electric railway bonds will have to carry a considerably higher rate. Another difficulty which utilities will meet in endeavoring to sell their bonds is that under the present income tax law surtaxes, the purchase of any securities which are not tax exempt is practically out of the question for those with large incomes. It has been determined, for instance, that a man with $100,000 taxable income can pay only 68.08 for a 5 per cent bond to have it net him 5 per cent, while a man with a taxable income of $300,000 can pay only 26.51 for the same bond to get a 5 per cent net yield. Hence, a considerable market which formerly existed for public utility bonds has now been practically cut off. This emphasizes the necessity for electric railway companies to develop local markets for their securities.

It is to be hoped that in any modification of the income tax effected by Congress this handicap will in some way be overcome, but, until that is done, even electric railways with a good income and "credit reestablished" will have difficulty in selling bonds except at a high rate of interest. This means that many conceptions by the public of what constitutes a "reasonable rate of return" on the value of electric railway property will have to undergo modification.

Anticipate the Automotive Age in Your Building Plans

THERE is so much more hindsight than foresight in this world that we may be pardoned for making a suggestion that may seem a little premature today, namely: Try to make sure that the shop or storage plant you plan today will not have to be reconstructed at great expense to care for a corps of automotive vehicles. By the latter we do not mean merely the gasoline utility trucks, of which electric railways already operate hundreds, but we also would make provision for future motor buses and freight-carrying motor trucks.

This does not imply that electric railways should forthwith arrange for the special equipment that goes with gasoline operation. What is suggested is that due consideration be given to the character of cellarage, foundation and partition walls, flooring, etc., for two purposes: First, that of easy rearrangement of spaces; second, that of better protection against fire and freezing than is required in a purely electric installation. Furthermore, whether gasoline or trackless trolley buses are in the offing, it will be well to consider what clearances in height and width should be allowed—a matter that may cost little yet save much—and also what conveniences are required to make easier the inspection and repair of equipment. Probably a study of layouts in the larger, high-grade garages and of the practices of the New York and Chicago motor bus companies would prove helpful in this respect.

Neither would it be a bad plan to see what local garage storage and maintenance facilities could be used without going to the expense of putting up a lot of gasoline equipment buildings. An electric railway equipment structure is necessarily special and has to be built at the railway's expense, even if only a dozen cars are to be housed. A few score automotive equipments, on the contrary, if scattered about the system, might be cared for most advantageously by large public garages if the electric railway management secures the wholesale rental and repair rates to which a big, steady customer is entitled.

Quotation from the Federal Electric Railways Commission Report

No. 8

WHILE the electric railway industry is essentially local, it has certain national characteristics. Its difficulties cannot be regarded simply as the isolated problem of a local system repeated hundreds of times all over the country in varied forms and degrees, each problem being independent of all the others. On the contrary,....a local traction system....is....inseparably connected with all of the others,.... The close industrial and financial interdependence of the hundreds of physically unrelated local traction systems, the millions of dollars of capital placed by thousands of investors in plants which manufacture electric traction equipment and the five billions of electric traction bonds and stocks to be found scattered all over the country in banks, insurance company reserves and in private investment translate the many local problems into a national problem.

St. Louis Plans Rapid Transit

Two Independent Reports for the Development of High-Speed Service and for the Relief of Metropolitan Congestion—Subways for Surface Cars Are a Feature of Each Plan—A Direct-Payment Plan of Charging One Cent Extra on Each Fare Is Suggested as a Means of Financing

TWO independent plans presented last fall in St. Louis deal with the future rapid transit development which is felt to be necessary in that city. One of these plans is a report on a "Proposed Rapid Transit System for the City of St. Louis by the Department of Public Utilities of the City," James A. Hooke, director; C. E. Smith, consulting engineer. The other plan is in the form of a preliminary report by the City Plan Commission of St. Louis, Mo., which is making an all-inclusive study of a general city plan for St. Louis and is proceeding on the basis of making preliminary special studies on each phase of the plan. This present rapid transit report is, therefore, one of these preliminary special studies. The latter report does not discuss the financial side of providing the rapid transit facilities, but refers to what it calls the "interesting discussion and proposal for financing rapid transit construction," which forms a part of the Department of Public Utilities' proposed system.

Naturally, all preliminary plans, such as both of these are, are subject to material modification before a system is in actual existence and operation. The studies, in the present stage, however, afford an opportunity to analyze and appreciate some of the difficulties of laying out a rapid transit system where none now exists, and also some of the possibilities where present rapid facilities offer no limitations to a comprehensive scheme.

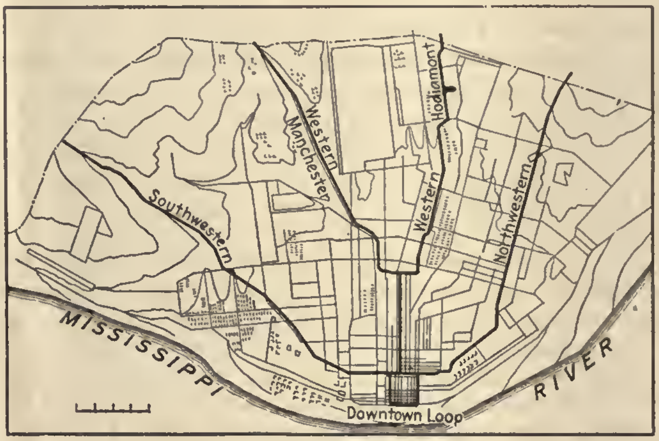
The Public Utilities Department Plan

Considering the plans in the order in which they were presented to the city, the plan of the Department of Public Utilities apparently looks further into the future than the preliminary plan prepared by the City Plan Commission. Both studies are based upon the same traffic investigation figures, namely, those made by the City Plan Commission.

The Public Utilities plan mentions three principal means of separating automobiles and street cars: (1) By improving paved streets for the exclusive use of automobiles and concentrating the street cars in the fewest possible streets consistent with good service; (2) by widening streets containing street cars, more particularly where these streets are paved for heavy automobile traffic; (3) by placing street cars in underground subways in the congested business districts and providing subways and elevated lines for rapid transit trains between the business and residential districts.

This report points out that there has been no real extension to the system for the past fifteen years, during which the city has increased about 25 per cent in population and the suburban communities have increased more than that. Accordingly this plan includes not only a bettering of the present transit facilities but also the necessary growth to handle the increased population and its modified geographical distribution.

The proposed development has six phases, the first of which is an immediate procedure, the five others following gradually but simultaneously. The first development is an immediate rerouting to expedite movement of cars and give better service. The details of this are largely of local interest and follow in principle rerouting studies made in other urban centers. It is interesting to note, however, that the proposed rerouting would make it possible to remove about 35 miles of single track of the present system, and the abandonment of this trackage would make possible the construction of about 15 miles of double-track extension with the money that would be spent in renewal of abandoned tracks.



RAPID TRANSIT ARTERIES PROPOSED BY CITY PLAN COMMISSION

The other developments are: Extension of radial and crosstown lines; subways for surface cars in congested districts; rapid transit subways and elevated lines; downtown stations for steam railroad suburban trains, and subway loops for Illinois interurban cars. The extensions of surface lines include both additions to radial lines and construction of some new crosstown lines, totaling approximately 65 miles of double-track extensions in the preliminary estimate.

The recommendations for subways for surface cars in the congested districts and the development of rapid transit subways and elevated lines are clearly indicated by the accompanying map. A total of 10 miles of surface car subways is shown on the plan, about 3 miles of which it is recommended be provided within the next five years. After the completion of the rerouting and the surface car subways, a total of about 95 miles of single track surface lines could be taken up.

It will be noted that the rapid transit plan contemplates double track in most of the mileage, but suggests three tracks to provide express service in the direction of heavy travel in some parts of the system. No differentiation is made between elevated and subway rapid transit lines as this is impracticable at the present time. Ornamental reinforced concrete viaducts are recommended for whatever elevated lines are built.

The estimated cost of three-track subways is $6,000,000 per mile and three-track elevated $1,500,000 per mile.

One of the elements of this transit development plan is the continued use of suburban steam railroads rather than surface or rapid transit electric cars. Those who are familiar with St. Louis will appreciate, however, that the present Union Station is too far removed from the business center to be useful as a commuter station. A double benefit would therefore be derived by building a separate station for trunk line suburban traffic in that this will be brought close to the business center and at the same time the elimination of the suburban trains from the Union Station would increase its capacity for handling through trains. Naturally, future electrification of the suburban trains and the area occupied by the Union Station is anticipated.

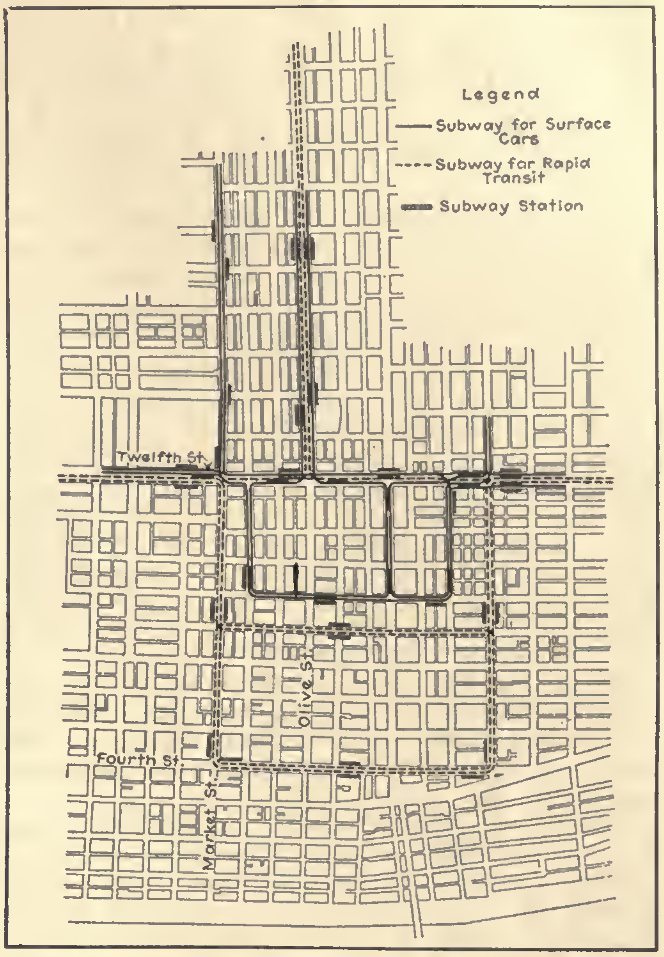
As indicated by the plan, it is contemplated to bring the interurban railways entering St. Louis across the river from Illinois onto an interurban loop which will be principally underground.

This report points out that the system of surface lines and rapid transit lines should be operated as one, similar to the Boston Elevated Railway, remarking on this point as follows:

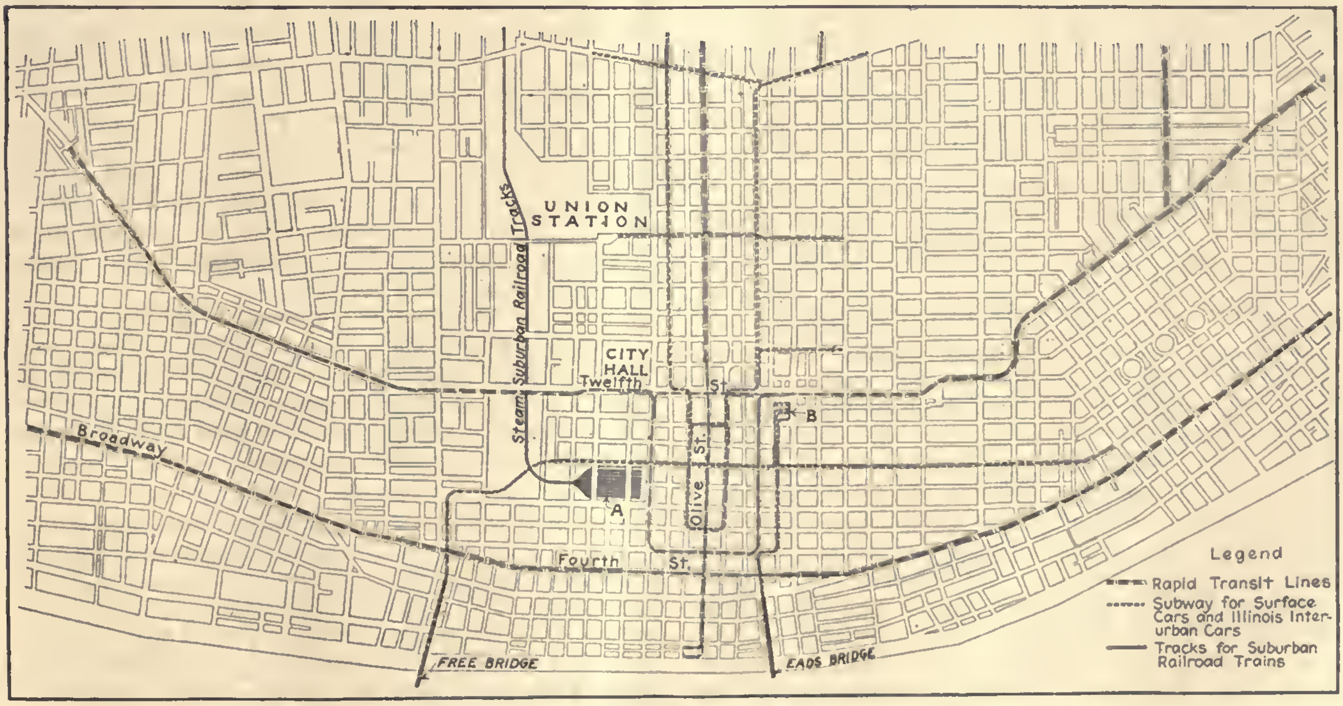
> It is not possible for St. Louis to have such a rapid transit system unless it be operated as a part of a surface system. If each were operated separately the rapid transit system would experience great difficulty in securing enough traffic to pay expenses except at high fares. The resulting decrease in travel on the surface lines would make necessary an increase in fares to pay their expense. By operating them as one, with universal free transfers, the surface lines become able to give the rapid transit lines the necessary density of travel and the service and cost of operating the surface lines can be reduced as passengers are turned over to the rapid transit lines.

FINANCIAL PLANS

It is estimated that the total cost, not including the suburban railroad station nor the interurban subways, would be somewhere in the vicinity of $200,000,000. Naturally, this could not be spent at once, nor could it be provided at once. A direct payment plan is recommended to finance the construction contemplated in the plan. By direct payment plan is meant the collection of one cent with each street car fare and the application of this money to the construction of the system. In the beginning it is stated that this amount, one cent, would have to be added to whatever other fare might be con-



DOWNTOWN RAPID TRANSIT LOOPS PROPOSED BY CITY PLAN COMMISSION


UNION STATION
Steam Suburban Railroad Tracks
CITY HALL
Twelfth St.
Broadway
Olive St.
Fourth St.
A
B
FREE BRIDGE
EADS BRIDGE
Legend
Rapid Transit Lines
Subway for Surface Cars and Illinois Interurban Cars
Tracks for Suburban Railroad Trains

DEPARTMENT OF PUBLIC UTILITIES PLAN FOR RAPID TRANSIT DEVELOPMENT sidered necessary, but as various improvements become effective, it is predicted that the charge would be partly and perhaps wholly offset by decreased cost of operation, with the ultimate result that the fare on the rapid transit system would be no higher, and probably considerably lower, than if the facilities had not been provided.

From the traffic studies made in St. Louis it is estimated that the sums given below would be available for rapid transit construction. This table contemplates an increase of 2½ per cent each year to the number of fares collected in the preceding year, which estimate is apparently borne out by past experience.

Year	Amount Each Year	Total to Date Without Interest
1920	$3,000,000	....
1925	3,394,225	$16,163,311
1930	3,840,254	34,450,402
1935	4,344,894	55,140,676
1940	4,915,848	78,549,818
1945	5,561,830	105,035,110
1950	6,292,701	135,000,788
1955	7,119,613	168,904,203
1960	8,055 188	207,262,801
1965	9,113,707	247,662,036
1970	10,311,324	299,764,273

On the above basis there will be provided in the next twenty-five years about $100,000,000. Mr. Smith estimates that the rate of increase will be greater and that one cent will amount to $200,000,000 in less than forty years, and in the meantime construction could start immediately and proceed at the rate of $3,000,000 for the first year, $3,500,000 per year by the second year, etc.

Three methods of financing by bonds are suggested as alternates: (a) City to raise the money for the sale of bonds to be paid off in twenty years according to the present practice; (b) city to raise the money by the sale of bonds and create a sinking fund to pay them off in thirty to fifty years; (c) private company to raise the money by the sale of bonds and create a sinking fund to repay them in fifty years. An extended analysis of the working of each of these three schemes is given.

It is recommended that the city proceed immediately upon a program which would contemplate some such construction as outlined, and it is stated that the city has the necessary legal authority to proceed with the program outlined without any change in the city charter or the state constitution. It is further stated that the ownership of the rapid transit facilities should be held in the city. They should be operated by the city if municipal ownership and operation comes to pass, otherwise their use should be permitted in the same manner as the streets which they supplant under such conditions as seem appropriate.

THE PLAN OF THE CITY PLAN COMMISSION

The report of the City Plan Commission is of course similar in character to that of the Public Utilities Department in that it quotes the traffic study and shows the limitations of the present system. It is accompanied by some very illuminating maps showing graphically the results of the traffic studies and also picturing regions not now reached by any satisfactory transportation service. It also shows the proposed car lines and isochronal zones for present and proposed routing.

The physical difficulties peculiar to St. Louis on account of the elliptical shape of the city, with the business district located at the extreme outer edge, are emphasized. The commission states that present tendencies with respect to the distribution of population seem to indicate that these difficulties are becoming more pronounced than ever before.

The City Plan Commission recommends that a rerouting of street car lines producing more direct service will meet the present needs of the city without the construction of rapid transit lines. St. Louis is a sprawling city and needs a greater intensity of development within the intermediate central areas before rapid transit facilities will be justified. Eventually St. Louis will need rapid transit facilities, though that day may be ten or twenty-five years hence. The commission therefore recommends in anticipation of this time and in order to relieve one of the more acute transit conditions of today in the congested business district that there be a subway constructed for surface lines, which subway may be so designed as later to form a part of a comprehensive subway system for rapid transit services.

There seems to be no difficulty, according to the commission, of locating satisfactorily at this time the necessary rapid transit lines of the city. Following out this thought, the commission laid out a proposed rapid transit scheme, which is shown in an accompanying map, the details of the downtown or congested district part of the map being shown in a separate drawing. It will be noted that the area covered by the City Plan Commission map is much greater than that covered by the part of the map of the Public Utilities Department.

The City Plan Commission report also calls attention to the fact that the development must be gradual and that the first step is an immediate rerouting of some of the present surface lines. Even this move is divided into three steps, a primary and immediate rerouting, secondary rerouting of transit lines, and a third or final step giving the complete rerouting of surface cars and the installation of subway routes in the business district. There is considerable discussion of the theory of loops, particularly subway loops for all surface cars, in the report. It is estimated that the initial short loop subway for surface car operation would cost about $17,000,000, and the complete rapid transit scheme including the downtown rapid transit loop and route to the various parts of the city as shown on the map would cost $80,000,000, making a total of $97,000,000 for all of the construction for rapid transit purposes and for removing practically all of the surface cars from the surface of the streets in the business districts.

It is planned that there will be no contact of the two systems, namely, the subway for surface cars and the distinctive rapid transit system, except that the systems may be operated in common. The two systems would operate in separate streets, so that they would both be as near the surface as possible.

Under the final plan it is estimated that there will be a possible abandonment of 66.97 miles of single-track surface and the construction of about 33.45 miles of new single track (exclusive of track in subways). Extension of existing lines amounting to 62.67 miles of double-track construction is also proposed.

As a result of a year's experience, the American Engineering standards committee has completely redrafted its rules of procedure. Copies of the revised rules can be obtained by addressing the committee at 29 West Thirty-ninth Street, New York City. The rules are brief and are confined to definitions of the several types of co-operating bodies and to the ways in which the committee functions in the development of a standard.

Unit Idea in Power Station Design

The Author Shows How the Unit Principle, Which Has Produced Good Results in Equipment Construction, Can Be Fruitfully Applied to Generating Plants as a Whole—The Plan Described Differs from the Designs Which Have Usually Been Known as Unit Designs in that a Unit Is Considered as Complete in Every Part

By LOUIS R. LEE
Chief Engineer E. W. Clark & Company Management Corporation, Columbus, Ohio

UNIT power plants, as designed and built by this company, are the outgrowth of experience gained in the operation and construction of steam plants over a long period of years. Also as operators of steam power plants we have become familiar with the common run of limitations of old and new plants built according to the cut-and-dried method. These limitations consist largely of high generation costs and the difficulty of making extensions at reasonable unit cost. Within their scope these experiences have not been materially different from those met by other utility operators.

The steam power plant for the generation of electric current has necessarily experienced a great many changes in the past twenty years due to the improvements in the equipment offered for this class of service. However, the equipment now offered by various manufacturers has reached a similarity in design which shows that a certain standard of development has been reached, and it is now not so likely to undergo radical change.

We must expect and hope, of course, that there will be detailed improvements in the make-up of various kinds of equipment. Some of these changes will be called for due to change in natural conditions, others due to characteristics of electrical load which must be carried, etc. However, we have today a much better line of equipment to select from than formerly, all of which can be purchased in a variety of sizes without much change in the efficiency, quality or general make-up of the piece of equipment itself. It is possible today to purchase turbines of from 7,500-kw. to 35,000-kw. capacity that do not differ materially in economy, operating characteristics, shape and general make-up.

We may even extend this generalization to unit first cost. The same truth may be told about other lines of equipment, the difference being only in degree, according to the nature of the service for which the equipment is used. To date, however, no such result has been secured for plants as a whole, but it seems to the writer that the time is ripe for such application.

WHY NOT STANDARDIZE THE POWER PLANT?

Progress has been made in standardization of equipment. We now need to secure similar benefits in power-plant assembly. Not much general progress has been made toward getting away from the idea that the plant must be a complete structure built especially for each particular locality. In other words, the design of plants has not kept pace with the design of equipment which has been used in the plants.

Standardization of assembly and general simplicity in arrangements are both badly needed. In some directions progress is being made. For example, it is becoming more or less apparent that we are going to arrive somewhere in the standardization of the use and application of electric current for all localities. For example, we have fewer frequencies than we used to have, there being practically only one standard for new plants, that is, 60 cycles. Other frequencies are used only where necessary to conform to existing conditions. Anything other than three phase and single phase is considered freakish. Much in the same way voltages are approaching uniform standards, and like improvement along other lines of standardization could be cited. Therefore, it is becoming more and more possible, feasible and practicable to look upon any and all electric power plants as simply sources of supply for so much electrical energy, the essential aim of the plant being to produce electrical energy at the lowest possible cost, reliability and continuity of service being accepted as a matter of course as among the prime requisites in all power plants.

THE TERM "UNIT" IS APPLIED TO OTHER THAN PRIME MOVERS OR BOILERS

In the unit design which this company has evolved the principal essential is that a plant is built up of units which are complete in every part and will operate and function as units, furnishing some fractional part of the total requirements of the power plant.

A power plant may be divided into several parts, depending somewhat upon the service given, but the plant as a whole naturally falls into two divisions, the first being the part which generates steam and the second that which generates electrical energy by the use of this steam. In other words, we have the boiler plant and the turbine plant. The turbine, with condenser, must be the principal unit of the turbine plant, with other units taking care of circulating water, air washing, electrical connections and other lesser units required for the complete functioning of this turbine plant. In the boiler plant there are boiler, economizer, furnace and draft equipment, as the greater unit with the lesser units that take care of coal supply, ash removal, feed-water supply and so on.

In unit plants so far built the term "unit" has usually been applied to the plant as a whole. Thus a 75,000-kw. plant made up of three 25,000-kw. turbines would be styled a three-unit plant, a certain number of boilers, auxiliaries and a turbine being one unit. In our plan the scheme is different, in that the "units" are independent of each other, but may be used collectively to accomplish some desired result. Thus we have boiler units, turbine units, coal supply units, and so on, each unit being a complete entity in itself with minimum interconnection with the plant as a whole. Similar progress in the design of automobiles may be cited. The engine, change gears and electrical equipment are now a unit on the modern car; the chassis, the frame and the rear axle are other distinct units which may be separated with minimum effort from the car as a whole for purposes such as repairs.

In the "unit power plant" design referred to the size of the individual units will vary according to the forecast of the ultimate size of the whole plant, but otherwise their characteristics will remain unchanged. The essential features of the designs of the different units are the same, and the benefits of standardization and design of details are achieved and made use of in a small plant as in a large one. Also there is in the small plant, and in the large one as well, a minimum investment involved in interconnection, in assembly and in total space required for the equipment.

FIXED CHARGES CAN BE KEPT DOWN BY CAREFUL PLANNING

One of the greatest burdens of the steam plant are fixed charges which result from a large investment, this investment having grown up gradually due to a chain of circumstances which result in a very large fixed charge made up of interest on the investment, taxes, insurance and depreciation. It would only be fair to say, of course, that up to this time much loss has been experienced due to change in design and improvement in the art. However, a great deal of unnecessary investment has been caused by lack of comprehensive plans; by too much tacking on the auxiliaries, piping, by-passes and other agents for interconnection of auxiliary equipment to provide for freak operating schedules. The result of this lack of clean-cut simplicity in design in power plants has been that repair costs have been high, reliability has been endangered and the economies have not been as high as they should have been if the equipment had been properly installed.

Much has been accomplished in recent years in the operation of mills and various manufacturing operations under scientific management. Not a little of the gain has been secured by planning systems, in other words maintenance work has been systematically taken care of under a planning scheme. The unit power-plant plan lends itself wonderfully well to a planning scheme. For example, the boiler units, made up of draft, stoker, boiler, economizer and feed-water equipment, can be repaired, inspected and thoroughly overhauled in a single operation by a comparatively small crew of men. As all of this work is done with the entire unit shut down, isolated from the rest of the plant and in no way endangering the reliability of service, these repairs can be made at minimum cost with convenience to the operators and to the operation of the station as a whole. This same holds true of any unit in the plant, including the turbine, the coal handling and other features.

Our plan is designed to insure low labor cost. In accordance with it the plant is made up of a number of units of predetermined size, any one of which will function as a fractional part of the plant as a whole. Thus, there is a minimum expenditure involved in interconnecting the units with each other, and in providing housing for the units. All units are so arranged that practically all operation can be taken care of from one floor level and all repairs can be taken care of with minimum interference with other units which remain in operation.

There are also many collateral advantages that result from building up a plant of complete units. As improvements in equipment are brought out by manufacturers, the new units which may be added to the plant can embody these improvements without interfering with or curtailing the full value obtained from the existing equipment. In plants with which we have had experience it has sometimes not been thought feasible to take advantage, from time to time, of improvements in equipment due to the fact that this would make it necessary to make radical changes in the arrangement of the equipment already installed. The unit idea has enabled us to get around many of these difficulties. It has also been possible to make more compact assembly of equipment, making important savings in building space. Practically every feature employed in unit power-plant design has been used in one or more plants, although there are many improvements in the latest designs that have not all been made use of in the same plant.

The unit design lends itself to rapid construction and allows taking advantage of many of the benefits in construction methods which heretofore have only been secured in the manufacturing plants. Also, standardization of assembly of equipment simplifies operation, requiring less study on the part of the operators of the arrangement of the station, because with all units of each class similarly constructed it is only necessary for an operator to understand the operation of a single unit of each class to understand the operation of the plant as a whole.

Any one who has had long experience in steam-plant operation appreciates that a great deal of the unlooked-for expense in steam-plant operation has come from expensive repairs which have been called for due to special arrangement, the repairs having to be made in a very short space of time. Furthermore, curtailment of output has frequently been caused by the necessity of shutting down certain parts of the whole plant in order to make repairs to individual pieces of equipment. The plant that is built up as a complete structure rather than as a group of complete units will be subject to much interruption of service, high maintenance cost and general unsatisfactory operation. This is illustrated by the fact that individual electric-motor drive owes much of its merit and popularity to the fact that it makes units of the machines to which it is applied.

SITE SHOULD NOT EXERT TOO GREAT AN INFLUENCE

Special conditions, such as real estate limitations, have called for extraordinary effort in design along some lines, but in many cases the limitations which existed have been accepted too complacently and allowed to influence the great investment in the plant as a whole, with very bad effect on economy in the long run. Limitations peculiar to a locality should receive careful study before they are allowed to increase unit investment costs. Fixed charges run on for all time and no amount of engineering talent can reduce the fixed-charge part of the total power cost except by increasing the load factor of the plant. After the initial investment is made the total will always be increasing if the plan which has generally been followed up to this time is continued; in other words, if a plant after being built is constantly receiving additions in the way of piping, auxiliary equipment, small changes in buildings, etc. On the other hand, if the plant is laid out in a simple, clear-cut manner, and if changes are made only as additional capacity is needed, each part of the plant being originally built at minimum cost, the fixed-charge burden then on the output will be a minimum.

Under present conditions the fuel item of power-plant operating cost is a very large one, and much thought must be given to the boiler plant to insure that all available heat generated by expensive fuel is used to the very best advantage. However, it is probable that fuel costs are now as high as they will be for a number of years and most localities have probably experienced their maximum fuel costs. But even with these high fuel costs, fuel economies have been emphasized too much and total investment too little. If we would have minimum total generating cost we must have low investment per unit of capacity.

Every power plant problem has in it certain distinctive elements or features which if considered in their logical order will help considerably in solving the problem. The following outline is offered as such a check on the investment and operating conditions:

1. *Demand:*

(a) Present requirements expressed by maximum demand and load factor, daily and seasonal.

(b) Prospective demand within a period of three years.

(c) Prospective demand within a period of ten years or more.

2. *Location:*

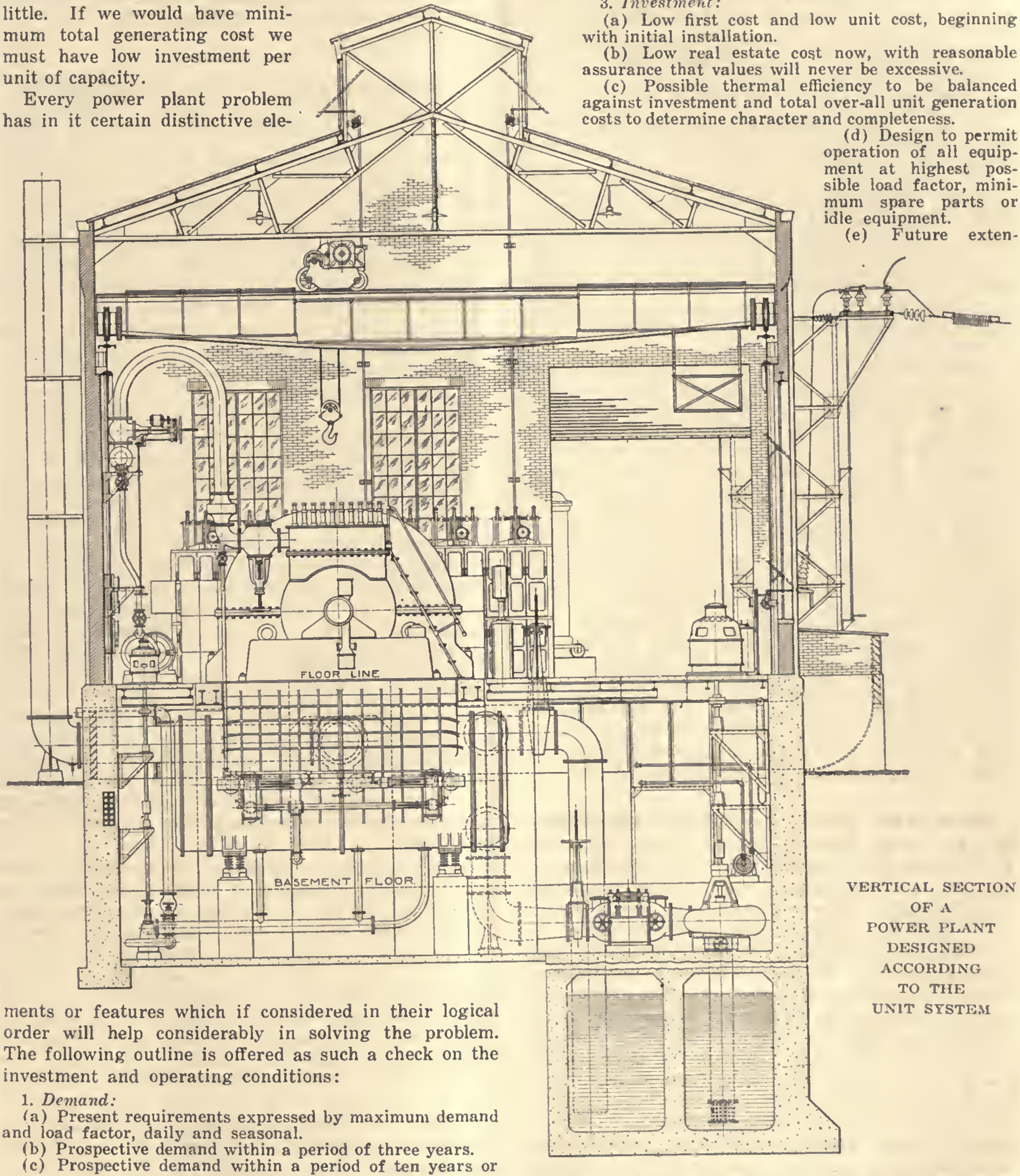
(a) Railroad or shipping facilities.

(b) Good water supply.

(c) Low freight rate on fuel.

(d) Earth that will allow permanent foundations to be constructed at reasonable cost.

(e) Freedom from floods or other natural disturbances.



VERTICAL SECTION OF A POWER PLANT DESIGNED ACCORDING TO THE UNIT SYSTEM

(f) Good quality of labor should be available, or there should be sufficient and satisfactory space where labor quarters may be built.

(g) Space for adequate fuel storage, and expansion for future requirements.

(h) In general plant should be located as near center of distribution as possible while meeting the conditions given above.

3. *Investment:*

(a) Low first cost and low unit cost, beginning with initial installation.

(b) Low real estate cost now, with reasonable assurance that values will never be excessive.

(c) Possible thermal efficiency to be balanced against investment and total over-all unit generation costs to determine character and completeness.

(d) Design to permit operation of all equipment at highest possible load factor, minimum spare parts or idle equipment.

(e) Future extensions taken care of by design and plans with least investment possible in building or other material provision for such extensions.

4. *Fuel Supply:*

(a) Value of fuel or waste heat available, to be determined by unit cost per kilowatt-hour of output, giving due consideration to probable boiler capacity that it may be practicable to obtain.

(b) Supply should be permanent and not liable to seasonal shortage.

(c) Some fuels may generally fill these requirements but have other peculiarities or disadvantages.

5. *Labor:*

(a) Design that will permit use of least number of men and of least highly skilled men, while giving uniformly satisfactory results.

(b) One-level operation with controls centralized or grouped, enabling labor to produce best performance with least effort.

(c) All equipment of like nature similarly arranged, enabling all operators to have clear understanding of plant requirements.

(d) Accessibility of chief requisite, facilitating inspection and maintenance.

(e) Good working conditions, considering light, ventilation, temperature, sanitation, transportation, facilities or proximity to good living quarters.

6. *Supervision:*

(a) Complete complement of indicating and recording instruments to give ready check and record of performance.

(b) Facilities should be such that unit quantities of fuel, steam and electrical energy may be obtained, recorded and be available for comparison and checking at all times.

(c) Facilities to be provided for keeping plant records, storing supplies, tools and repair parts.

(d) Plant must have best possible means of communicating with distributing centers and of communicating or signaling within plant.

While every item in the above outline deserves careful consideration, it is believed that there are some which are generally overlooked or their importance minimized. For example, referring to 1, "Demand," the future for, say, ten years is either ignored or too much emphasized, often resulting in poor ultimate layout or a carrying of much idle investment. The future must be considered, but should be taken care of as far as possible by design rather than by material investment.

Fuel is only cheap when its use results in cheap power and allows a minimum investment in boiler plant. We should not be concerned over thermal efficiency so much as plant efficiency, which takes into consideration fixed charges as well as the operating costs. For example, a certain boiler installation when operating at 175 per cent of boiler rating may have a very high efficiency, but if the boiler cannot be pushed to at least twice this rating and still maintain a good efficiency for boiler plant as a whole then the layout is undesirable by the amount it may fall short of some such result.

Some Very Large Electrical Apparatus

IN ITS annual review of engineering accomplishments the Westinghouse Electric & Manufacturing Company this year mentions several pieces of electrical equipment as the largest of their several kinds.

For example, at the Colfax power station of the Cheswick Power Company, a subsidiary of the Duquesne Light Company, a 60,000-kw., 60-cycle, triple-element turbine unit was started on Dec. 18. This is the second unit of this type which has been put in operation. Again, a 32,500-kva., 25-cycle, 150-r.p.m. vertical water-wheel generator was also put in commission at Niagara Falls, one of the group of three units there which are the largest in the world.

For the Colfax plant the company also supplied a record-breaking transformer. This is a single-phase, oil-insulated, water-cooled transformer of 23,600-kva. capacity. It transforms 60-cycle current from 12,000 to 132,000 volts. There are also under construction in the shops a group of seven 12,000/220,000-volt, 60-cycle transformers of 16,667-kva. capacity for the highest commercial voltage yet adopted for power transmission. They are for the Pacific Gas & Electric Company.

To the Philadelphia Electric Company two 1,750-kva. induction-type regulators were supplied for use on the low-tension side of the transformers supplying the two 66,000-volt tie lines between the Schuylkill and Chester power plants of this company.

The review refers also to a new face-plate type of voltage regulator which has been devised to perform the same service as that furnished by the vibrating relay type of regulator.

1,750 at Dinner of New York Railroad Club

THE second annual dinner of the New York Railroad Club was held at the Hotel Commodore Thursday evening, Dec. 16, and there was an attendance of more than 1,750 members and guests. An introductory address was made by John A. Droege, general superintendent of the New York Division of the New York, New Haven & Hartford Railroad, who has recently been elected president of the club. The toastmaster of the evening was William G. Besler, president of the Central Railroad of New Jersey. The principal address of the evening was made by James A. Emery, counsel of the National Industrial Council, who presented a paper on "Transportation Combinations and the Public Interest." The principal theme of Mr. Emery's address was contained in the questions, Do our modern industrial societies possess adequate powers of self-defence? and Are the people of the United States powerless to restrain a combination of those voluntarily engaged in the public service within the limits of social safety or must they submit to the unrestricted exercise of its collective power even though it imperils their social structure? He discussed the matter of national labor boards of adjustment and in concluding submitted four tests which appeared to him to determine whether the purpose of Congress as stated in the transportation act is being executed and the supreme interests of the public protected. The tests are:

1. No mode of adjustment or agreement should receive approval that does not assure a review, participated in by representatives of the public, of every serious controversy or negotiation. Any proposal to establish relations between carriers and their employees the purpose or effect of which is to eliminate review or supervision by the representatives of the public should be rejected.

2. No form of adjustment or agreement is in conformity with the purpose of Congress nor should be approved by the board that does not equally recognize and protect the rights of employment, adjustments and representations of unorganized employees of the roads.

3. No form of adjustment or agreement should be approved that does not safeguard the efficient and continuous operation of train service. To this end each road should be considered as the unit of operation and self-interest, management and men stimulated to the cultivation of personal relations by continuous contact between executives and employees, that each man may find in the road which he serves the prompt means of protecting his interests and the opportunity of advancement through merit.

4. Since the public interests require the assurance of uninterrupted service, the board should ask the carriers and their employees, in whatever form agreement between the respective roads and their employees take, to accept without strikes or lockouts the ultimate decision of the board upon any question within its jurisdiction.

Trackless Trolley in Two British Cities

Bradford, with Three Routes in Operation, Is Planning Three More—The Buses Are Used as Feeders for the Trolley System—A Double-Deck Trackless Trolley Bus Has Just Been Put in Service—Keighley, After Five Years' Experience, Has Added to Its Equipment and Now Has Nine Buses in Service

A REVIVAL of interest in the trackless trolley is apparent in this country, although it is not clear whether this interest is sufficiently deep-seated to lead to the construction of many roads of this type in the early future or not. For our experience with the trackless trolley we must go to Europe, for there, as in the case of the motor bus, much more has been done than in this country. The chief reasons are fourfold: The early advent abroad of smooth paving, the larger proportion of narrow and curved streets in the older city districts, the difficulty of securing right of way for tracks under British laws and the higher price of gasoline. Yet, in spite of these favorable conditions, the development in Europe has not been large, though with the increasing cost of gasoline the advantages of the trackless trolley become greater.

One of the largest trackless trolley installations in England is in Bradford, where both track and trackless electric operation are under one management, the municipality. For the fiscal year ended March 31, 1919, the Bradford Corporation Tramways earned a traffic revenue of £456,818 from the cars and of £15,121 from the trackless trolley buses. As to capital charges and operating expense, R. H. Wilkinson, general manager, made the following comparison before the 1919 Conference of the Municipal Tramways Association:

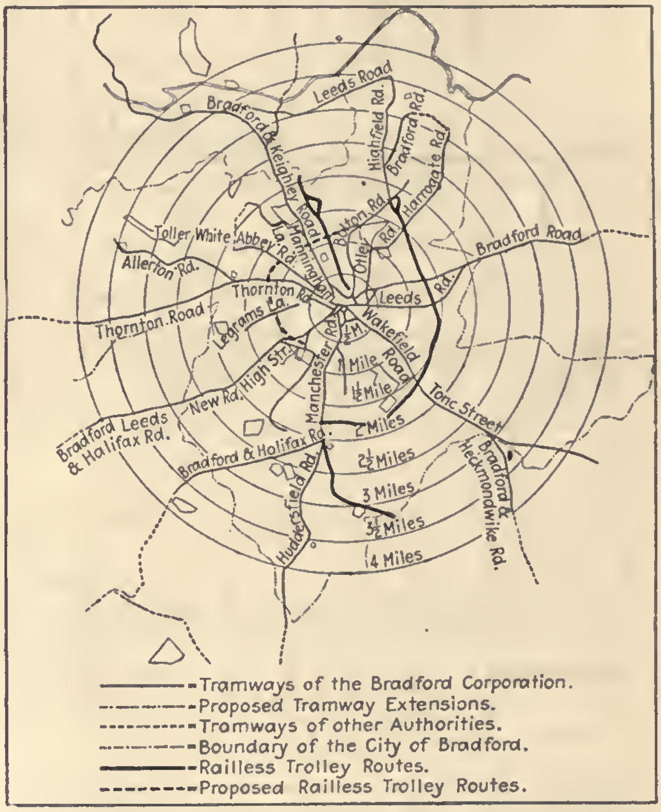
TABLE I—COMPARISON OF CAR AND TRACKLESS BUS ON VEHICLE-MILE BASIS IN PENCE PER MILE

Fixed charges......	2.675 for car and	1.50 for Bus or	43.9% less
Operating expense..	16.542 for car and	11.97 for Bus or	27.6% less
Total charges......	19.217 for car and	13.47 for Bus or	29.8% less
Comparison of Car and Trackless Bus per Passenger Carried in Pence per Mile			
Fixed charges......	0.18 for car and	0.16 for bus or	11.0% less
Operating expense..	1.11 for car and	1.28 for bus or	16.4% more
Total charges......	1.29 for car and	1.44 for bus or	11.6% more

It will be apparent from Mr. Wilkinson's comparison that the superiority of the trolley car is due chiefly to its greater capacity. The present bus is a twenty-nine-seat single-decker weighing 5 long tons (11,200 lb.), which limitation is due to roadway rules. Mr. Wilkinson has lately designed a fifty-one-seater, including smoking compartment, for which he is seeking approval. Should the new design be acceptable to the authorities, he will have a bus approaching more nearly the capacity of his double-deck cars and perhaps less costly per passenger carried on the basis of overhead and operating costs combined.

Although only three trackless routes are shown on the accompanying map of Bradford as in operation, plans are in prospect for three more. The characteristics of present and future lines can readily be judged from the map as well as from the comparative revenues of tram and bus. One route (Frizinghall) starts from the city center at the Midland Railway station, sandwiched by two trolley lines for about one-half of its length of 2.6 miles. Its earnings were 10.6d. (21.2 cents) per mile. The second route (Okenshaw), 1.6 miles long, is obviously a suburban feeder which ties in with two trolley routes just 4 miles from the center of the city. This route earned 10.8d. (21.6 cents) per mile. The third route, 4.7 miles long, is a cross-town service which ties in with half a dozen radial trolley lines at points 1.5 to nearly 2 miles from the center of Bradford. This line earned 10.88d. (21.76 cents) per mile.

The three new lines would comprise a second cross-town line, a tie between two trolley terminals and an extension to an existing trolley line. From this, it is clear that the trackless trolley development at Bradford is along the lines to be expected in supplementing an existing tramway service with either the trackless trolley or the gasoline motor bus to take care of light-traffic routes. Although the Bradford Corporation Tramways operates gasoline motor trucks for municipal utility purposes, it has not acquired any gasoline passenger vehicles, perhaps because it has not arranged to serve conditions where the traffic routes might be subject to change.



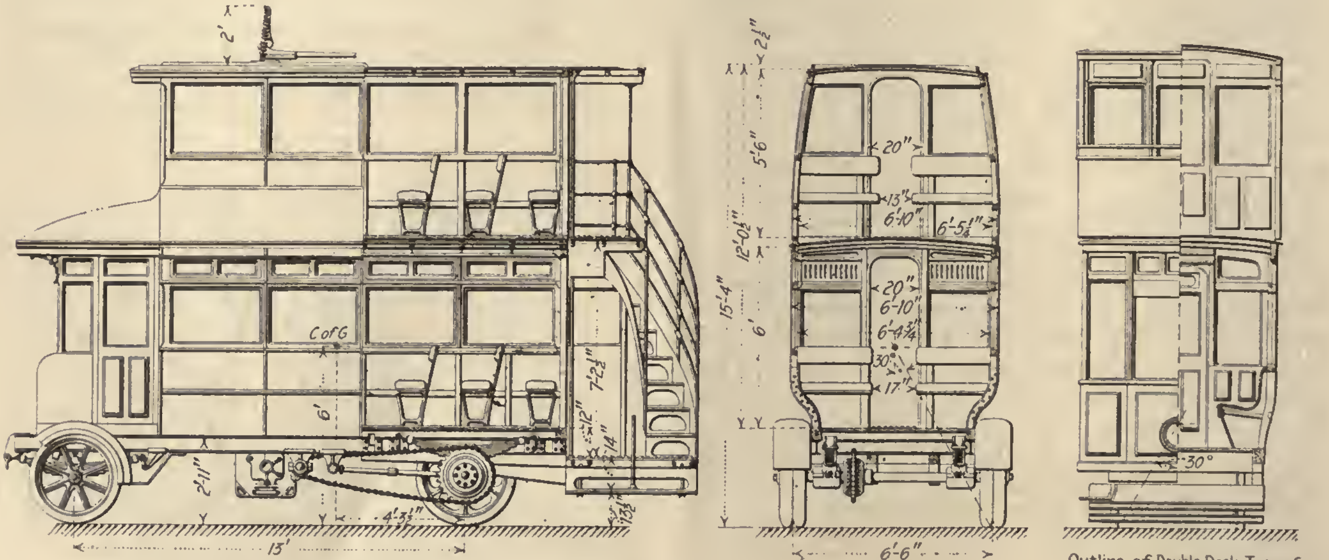
PRESENT AND PROPOSED TRAMWAY AND TRACKLESS TROLLEY LINES, BRADFORD, ENGLAND

Inasmuch as the gross earnings per car-mile were 22.257d. (44.514 cents), compared with less than half that figure on the trackless routes, we need not be astonished to find that the fares on the trackless trolley routes are somewhat higher, as indicated in the accompanying Table II.

TABLE II—COMPARISON OF CHARGES IN BRADFORD

Average Distance for Stated Fares on Car	Average Distance for Same Fare on Bus
1.66 miles workman's 1d. special-hour rate	1.55 miles
No 1d. fare	0.70 mile
1.66 miles regular 1.5d. fare	1.55 miles
2.48 miles regular 2.5d. fare	2.00 miles
3.52 miles regular 3.0d. fare	2.64 miles
4.14 miles regular 4.0d. fare	3.34 miles
5.09 miles regular 4.5d. fare	4.85 miles
6.96 miles regular 6.0d. fare	....

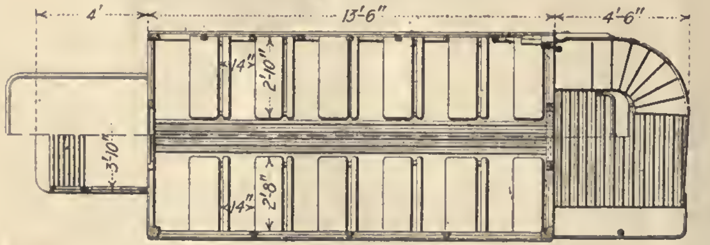
The average fare charged per mile on cars was 0.868d. (1.736 cents) and on the trackless trolley buses 1.078d. (2.156 cents). The figures of trackless trolley service by the Bradford Corporation Tramways are arranged in accordance with the standard system of accounting used by British municipal railways, so that comparisons with Bradford's cars can be made in a number of items showing the following:



Elevation

Cross Section

Outline of Double-Deck Tram Car, showing comparative Size



Half Longitudinal Section through Top and Bottom Saloons

DOUBLE-DECK TRACKLESS TROLLEY BUS IN EXPERIMENTAL SERVICE IN BRADFORD

On a vehicle basis, wages of platform men appear to be practically alike, the trackless bus averaging 4.415d. per mile against 4.312d. on the larger cars. Cleaning and oiling a trackless bus is apparently less costly per vehicle than a car, the relative figures being 0.399d. and 0.794d. Fire insurance is no greater than for the electric car, but the accident and compensation insurance item of 0.045d. per mile is double that for the car (0.233d), probably because any trackless vehicle is a bit of a vagabond.

The relative maintenance charges for the electrical equipment of line are 0.041d. for the trackless trolley and·0.267d. for the double-track car routes, a difference which can be ascribed to the fact that a trackless trolley requires a return circuit as well as a contact wire and some special features here and there. The trackless trolley, on the other hand, had to pay a road upkeep charge of only 0.374d. per vehicle-mile, whereas each car operated was assessed 1.289d. per car-mile for general repairs and maintenance of permanent way. In this last instance the trackless trolley has to pay approximately half as much per seat as the car.

From a vehicle maintenance standpoint, the car had the better of the comparison, averaging 2.678d. per mile against 3.201d. per mile against the newer and half as large trackless trolley bus. The energy consumption of the bus was 1.509 kw.-hr. per mile compared with 2.717 kw.-hr. for the bigger cars. Considering also that the trackless trolley buses must have averaged a smaller number of stops per mile and that they were not operated over the busiest and steepest streets, it is reasonable to assume that for Bradford paving conditions they would require almost twice as much energy per seat if single-deck bus remains pitted against double-deck car. This would not be true if double-deck trackless buses succeed. However, a comparison of the twenty-nine-seat bus at 1.509 kw.-hr. with a thirty-two-thirty-five-seat safety car averaging 1 kw.-hr. per mile indicates that a substantially higher energy consumption must be reckoned with on the part of a trackless trolley bus even though its weight per seat is below that of the lightest American trolley car.

COST OF GASOLINE OPERATION HIGHER

Mr. Wilkinson's new double-deck trackless trolley bus is the first to be built of that type so far as is known. It is difficult, therefore, to make an exact comparison with the double-decker thirty-seven-seat gasoline bus as used extensively at Sheffield. However, the operating cost of the Sheffield bus averaged 17.896d. for the year ended March 31, 1919, compared with the 11.970d. operating cost of the twenty-nine-seat trackless trolley bus at Bradford as previously detailed. For the same period, the operating cost of the fifty-two buses at Birmingham averaged 18.944d. per bus-mile. The Edinburgh Corporation Tramways expect a thirty-two-seat single-deck bus to cost 20.75d. per mile, but this makes allowance for the higher wages that will prevail in 1920 as compared with 1918-1919. In any event, the extraordinarily high price of motor fuel in England (89 cents per gallon in March, 1920, and 1.10 cents in October, 1920) is putting the trackless trolley in a more advantageous position wherever there is enough traffic for something better than hourly or half hourly headways.

In the case of the 5.1-mile Tees-Side Rail-less Traction System, opened as recently as Nov. 8, 1919, the trackless trolley won out over the gasoline bus because of its lower power and upkeep costs, while it won out over the track trolley because the intended average headway of 15 minutes (30 to 7.5 minutes) did not warrant a construction cost of £12,500 to £15,000 per mile of single tangent track compared with the pre-war price of £4,500. This Tees-Side installation is worth mentioning because it is for conditions that in this country have hitherto led to the construction of highway trolley lines, necessarily of single-track construction and therefore none too adaptable to sudden accretions of traffic.

TRACKLESS TROLLEY COSTS HAVE RISEN LESS THAN BUS COSTS

Another British enthusiast for the trackless trolley is Harry Webber, general manager Keighley Corporation Tramways. On March 19, 1915, after five years of gasoline motor bus operation, he inaugurated a trackless trolley system comprising nine vehicles running over 8¾ miles of route in rather hilly country. At that time gasoline cost but 2d. per mile for a thirty-eight to forty-seat double-deck bus, while power for the twenty-eight-seat electric single-decker which replaced it cost one-half as much. An operation of 100,000 miles per annum was sufficient in power saving alone to cover interest and depreciation on the electrical overhead equipment. Owing to the uneven torque and the greater weight of the gasoline bus, the tire upkeep of the gasoline bus had cost practically four times as much as that of the electric bus, according to Mr. Webber.

A TYPICAL TRACKLESS TROLLEY BUS

Perhaps the most interesting fact is that although the electric buses were smaller, their greater cleanliness, smoother running and better lighting increased the passenger earnings from 24 cents to 28 cents per mile.

Trolley Freight Service Will Pay

Why It Can Successfully Compete with Steam Railroads and Motor Trucks—Practical Hints on Operation Are Given—Selection of Freight Manager Most Important Step

BY G. W. RAVERT
General Freight Agent Philadelphia Rapid Transit Company

THE emphasis placed upon the importance of the development of the electric street railway as a freight carrier, at the recent convention, should be very significant to all electric railway companies which are not operating a freight service. Pages and pages have been written on this subject, but its real importance, its financial possibilities and the principles underlying its management are not widely known and recognized. This is evident from the following quotation from the address of Mr. Graham, vice-president of the Pierce-Arrow Motor Car Company:

> In long-distance movements of heavy tonnage they [the electric railways] are surpassed by the steam roads; in short-distance transit of less than carload lots, up to 100 miles, they cannot compete with the motor trucks.

In short hauls up to 15 miles the electric street railway pays homage to and will gladly surrender such business to the motor truck, but in movements of heavy tonnage or less-than-carload lots, ranging from 20 to 200 miles, neither motor truck, steam road nor any other land carrier can successfully compete with the electric street railway from the standpoints of economy, reliability, dispatch and financial return.

The possibilities of the electric railway as a freight carrier are very great, yet it is a curious fact that this valuable form of transportation has hardly passed beyond the experimental stage. This condition is largely due to the shortage of managers capable of directing such traffic and the lack of competent counsel along freight lines, thus preventing the trolley freight from assuming its proper status. The general managers of the roads too often are completely absorbed in the passenger service, unconsciously letting a veritable gold mine lie unnoticed in their own back yards.

Most of the writers on this subject advocate the application of railroad principles. This was a good policy while the business was in its infancy, as every one realized the value of standardization, but now that the electric railway is emerging from the general class of freight carriers and stepping into a class by itself, it is absolutely natural and necessary that it should adopt methods and principles peculiar to its condition.

Economically, the advantages of the trolley freight service transcend those of the passenger service, yet it does not in any way interfere with such service. Financially, it is a better investment than the passenger service, for the reason that a carload of passengers represents from $5 to $10 in receipts, while a carload of freight, at a lower operating cost, represents from $50 to $75 in receipts. A striking example that the steam roads, old-time express companies and motor trucks are not considered successful competitors financially is shown by the fact that many large firms having their own motor trucks know from accurate cost records that it is cheaper to ship via trolley freight. The railroads are slower, express companies are more expensive and not so efficient, and the motor truck is essentially a fair-weather carrier and its rates are high. The trolley freight runs rain or shine, and, excepting in rare cases, all through the heavy winter storms, and delivers to more points convenient to consignees than any other carrier. In fact, its possibilities in this direction are unlimited. Ultimately goods will be delivered directly to the consignee's place of business.

NEEDS OF BUSINESS DESCRIBED

By far the most important first step in the promotion or expansion of the trolley freight is the selection of the freight manager. He should be a practical man, possessed of sound common sense and must be able to deal with men who work with their hands. He should be one who could go out and sell a service, not rates, as is the case with many freight-transportation companies. For example, a freight manager well known to the writer put forth the argument that trolley freight rates should be about 10 per cent lower than those of the steam roads in order to secure business. He also made a practice of encouraging his company to settle freight claims in favor of his shippers, as an inducement. This reminds one of the old-time cut-throat methods, and the disastrous effects it has on the business can be readily appreciated. In reality, the rates should be from 10 to 15 per cent higher than on the steam roads, in view of the more prompt and efficient service given, and all classes lower than fourth should be eliminated. Rules reducing the second and third-class rate should also be removed. This can be consistently done by taking an exception to the official classification, provided the business is based upon the rules and laws set forth by the steam road official classification.

An adequate terminal consisting of inbound and outbound platforms, together with a team yard, within easy reach of the big shippers, so built and located as to permit its keeping pace with the expansion of the business, is another prime essential. Two or three freight cars (according to local conditions) are all that are necessary at the start. These cars will pay out of their earnings for all additional equipment as it is needed by the ever-growing business. Here again, the manager proves a valuable asset. If he is not getting 100 per cent of use out of his equipment before shouting for more, he is wasting money.

It is advisable, of course, to use equipment especially adapted to freight traffic. Cars should be of modern type, built specially for interurban freight service and capable of hauling one or more trailers. Of course, many roads are operating with abandoned passenger cars, revamped, and are making money, but the time lost in the repair shop and the lower standard of efficiency cut their net profit considerably. Such cars are too small and ungainly, sacrificing strength for misplaced economy, and as they naturally are of all sizes and shapes, they do not permit a standardizing condition.

Reliable and adequate records are a strict essential in any business, but in the freight business they are a vital necessity. Probably most transit companies fail to realize the possibilities of the freight through their lack of reliable cost records. Briefly, the following outline covers most of the essentials and gives an accurate method of checking freight from the receivers into the freight cars. This plan cuts down claims to a negligible minimum and at the same time insures despatch.

A modern rating and billing system is of first importance, that is to say, each shipment must be covered by a waybill which should accompany the goods to its destination. Most roads have their bills made out by hand, using copying pencils and carbons, each biller rating his own bills. Many errors and subsequent loss of time and efficiency result from this practice. A special rate clerk doing rating exclusively can accomplish more work efficiently and accurately than by the former diffused method. At the inbound office, the procedure is somewhat similar. The goods should be checked from the cars against the bills received from the point of origin.

Aside from these salient points the rest of the office work can be governed by any modern standard method. It is of the utmost importance that proper cost records be kept and that a proper distribution of charges for maintenance and operation be made, in order that the freight is not charged with a host of unwarranted accruals.

These facts and suggestions are merely a few of the high lights in the proved advantages and possibilities of electric trolley freight, and, springing as they do from the comparatively short career of trolley freight, hold a promise of an unlimited future for this system of freight transportation.

Some Aspects of Electric Railway Progress in 1920

W. D. BEARCE, of the railway and traction engineering department, General Electric Company, has prepared an analysis of that company's experience in connection with railway work in 1920. He states that the most notable activity has been in connection with the safety car, automatic substations and steam railroad electrification.

As to automatic control, the 2,000-kw. motor-generator set with complete automatic control furnished for the Detroit River tunnel electrification has been in operation for several months. This is the largest unit yet operated automatically in railway service. A notable order for automatic equipment was that for eight 1,000-kw. control equipments and transformers for the 1,500-volt, direct-current substations of the Victorian Railways at Melbourne, Australia. In New Zealand the 300-kw. automatic substation ordered last year was put in operation on the Christ Church Tramways and this company has ordered two more.

The company's electrification work in the United States has been confined to the Milwaukee extension, for which five gearless locomotives were furnished. Outside of the United States work on the electrification of the Paulista Railway in Brazil and the electrification work for the Montreal Harbor Commission are well under way. In addition to the Paulista Railway electrification, another important project in South America is the equipping of the Santa Catharina lines in Brazil for 1,500-volt operation with multiple-unit cars. About 50 miles of these lines are being equipped for such service.

In a bulletin on automatic station control equipment recently issued by the General Electric Company, the following features of automatic stations are summarized: Minimum operating personnel required, better protection provided, maintenance cost reduced, distribution pressure improved, feeder loss decreased, standby loss decreased, electrolysis mitigated, insurance increased, reliability increased, development of small power sites made feasible.

The Bus and the Trolley

The Author Takes Issue with the Statement of the Motor Truck Manufacturer that the Electric Railways Cannot Hope to Compete with the Steam Railways and Motor Trucks in the Transportation of Freight—He Bases His Conclusions on the Situation in Southern California, Where the Conditions Are Most Favorable to the Operation of Motor Trucks

By H. B. TITCOMB
Vice-President Pacific Electric Railway, Los Angeles, Cal.

I HAVE read the editorial in your issue of Nov. 6 under the caption "Shall We Turn the Freight Business Over to Motor Trucks?" as well as the statement of George M. Graham, vice-president of the Pierce-Arrow Motor Car Company, in his address before the American Electric Railway Association, that electric railways should not figure too hopefully on freight revenue, as they cannot successfully compete with steam railways and motor trucks.

> ### *To the Trade*
>
> WE are frequently requested by our customers to forward their orders by truck. It is immaterial to us how the goods go forward, as our responsibility ends when we get the carrier's receipt. There is, however, a condition surrounding truck shipments to which we wish to call your particular attention.
>
> Since the beginning of the war, and the resultant delays in railroad freight deliveries, there have come into existence a multitude of trucks for freight haulage between interurban points. The people operating a great many of these trucks are absolutely irresponsible financially. Freight is intrusted to them without any guarantee whatever that it will ever be delivered at destination, or, if short, that any claim will be paid. A great many of these people have only a small equity in their trucks. If a serious shortage should occur it would be utterly impossible to collect the claim, owing to the carrier's lack of tangible assets.
>
> In view of the above facts we wish to impress on our trade that we ship by truck only when so instructed by our customer, and that our responsibility ceases absolutely when we secure the carrier's receipt for the shipment in good order. When shortages occur we will not assume the claims for the customer. He must make his own settlement with the carrier.
>
> This is no reflection whatever on the many reputable companies operating freight trucks, but is intended as a warning to protect both our customers and ourselves against loss through irresponsible carriers.
>
> Be sure that your carrier is responsible before you intrust your goods to him.
>
> —Notice which a Los Angeles heavy hardware concern sent out to its customers.

I most emphatically take issue with Mr. Graham's statement. If there is any place in the United States where conditions are favorable to the successful operation of motor trucks in competition with rail lines it is in southern California, where there are more miles of paved highways than there are in any other state in the Union with the possible exception of New York State.

Good roads are essential, and it is proper that they should be built, but it was never intended by the taxpayers of any state that these good roads should be turned over to any individual or group of individuals for private gain, yet the anti-corporation feeling of the public has been used as a cloak to build up under this subsidy plan a competitive system that is not just and is out of line with the American spirit of fair play. Every industry, every public utility and every form of business must be remunerative within itself; otherwise it should not exist. Any such facility that cannot be made self-sustaining must not, under any stretch of the imagination, be subsidized out of general taxation. Such socialistic tendencies are not in line with the American spirit and should not be tolerated by the American people.

WHY BUS DEVELOPMENT HAS TAKEN PLACE

Mr. Graham also says: "The motor bus can never eliminate the trolley." With this I agree, but I cannot agree with his further statement that "the public is eager to use the bus." The American public has come to use buses simply for two reasons: (1) Prejudice against corporations in general and the railroad corporations in particular, and (2) the inability of some railroads to give service to developing communities.

As to the first reason, the experience of the traveling public with the corporations that control the motor bus lines has been to show that after all the rail line corporations were not as grasping and as dictatorial as had been pictured.

As to the second reason, financial difficulties have been responsible for lack of development on the part of electric railway transportation companies. The people have had an idea that the coffers of these companies were of unfathomable depth and that money could always be obtained for the development of railroad facilities. Pyramided prices of labor and materials and reluctance on the part of politicians and soap box orators to recognize the necessity for higher fares have in many cases kept conscientious railroad commissions from doing the fair and reasonable thing that justice demanded. In other words, the general thought seems to have been that if these corporations were impoverished they could give better service. But the effect of this policy has simply been to drive money into more remunerative lines. To a great extent, however, this is being overcome. I believe I am not too optimistic in saying that the pendulum is swinging back, and I believe there is a bright future for the electric transportation concerns of the country.

The motor bus will not become a thing of the past. It is performing a service that is necessary in many cases, but it cannot supplant the electric or steam lines. It can be made an adjunct to such lines on a businesslike and remunerative basis. The railroads can no longer play the "dog in the manger," and where communities develop and warrant the establishment of service, these transportation companies must extend their rail lines or put in feeders that will reach the nearest point of existing rail transportation and, by a system of through fares and tickets, give the people dependable and positive service that can be properly regulated by governing bodies. This can be accomplished by contracts with bus concerns or the formation of bus corporations to operate in conjunction with existing transportation lines.

The Pacific Electric Railway started handling freight in a small way more as an accommodation to its patrons than with any idea that the business would prove remunerative, but as conditions changed and the public became acquainted with the service we were able to render the demand for it became more general and our freight revenue has shown a steady increase.

The Pacific Electric system radiates from Los Angeles, the longest interurban line being approximately 70 miles. We have a roadway mileage of 615, but, as there are certain points where our old franchises did not contemplate the handling of freight, we have a freight road mileage of 519, and we find that the revenue derived from the transportation of freight today is equal to approximately 24 per cent of our total revenue.

WHAT RAILWAYS AND BUSES PAY FOR ROADWAY

The Pacific Electric Railway is typical of the better class of interurban railroads of the United States. It has come out of the war period with its tracks, its equipment and its service in better shape than any other interurban railroad, barring none. We have the highest skill that can be obtained in railroad management, and our operating personnel, from the section foremen through the train service and all departments, is of high class, with good esprit de corps, better feeling and higher efficiency than any similar transportation company in the country. But this has been accomplished by the optimism of the financial backers of this splendid property. Through this war period and through the competitive period brought about by the advent of the automobile they have stood by this property, knowing that it would ultimately realize the dreams of its founders, although there is an accumulated deficit of upward of $11,000,000 loaned to this company to tide it over. The public should know and should appreciate this in order that it may bear with us in the readjustment that is necessary to "get on our feet" again.

Our property is worth far in excess of the $70,000,000 on which we are trying to pay interest. The following figures may be of interest:

FINANCIAL REPORT OF PACIFIC ELECTRIC RAILWAY, FOR TEN MONTHS ENDED OCT. 31, 1920

Gross operating income	$12,630,000	
Operating expense:		
Way and structures	$1,241,000	or 9.1 per cent of gross income
Equipment	1,596,000	or 12.6 per cent of gross income
Power	1,430,000	of 11.3 per cent of gross income
Conducting transportation	3,783,000	or 29.9 per cent of gross income
Traffic	133,000	or 1.0 per cent of gross incoma
Auditing expense, store, supplies, damages, etc.	1,046,000	or 8.2 per cent of gross income
Summary:		
Wages	$6,205,000	or 48.0 per cent of gross income
Material charges	3,024,000	or 23.9 per cent of gross incoma
Depreciation and taxes	742,000	or 5.9 per cent of gross income
Interest on bonds and borrowed money, and other miscellaneius deductions	3,487,000	or 27.5 per cent of gross income

These figures show that maintenance of way of our tracks, bridges, private rights-of-way, etc., eliminating all rolling equipment, building, stations, power stations, overhead equipment, trestles, etc., is $958,000. This is 7.5 per cent of the gross income. Our state taxes are 5.25 per cent of our gross income.

We have invested approximately $45,000,000 in private rights-of-way, paving, bridges, trestles, culverts, switches, ballast, fences, etc., not including rolling stock, buildings of all description, electrical equipment of all description, etc. Six per cent on this amount is $2,700,000 and on the basis of a $15,000,000 income this sum would represent 18 per cent of our gross income. If to this percentage the percentage for maintenance, 7.5 per cent, and for taxes, 5.25 per cent, is added, a total of 30.75 per cent of the gross income is required to furnish a roadway on which to operate.

As against this we know that the ordinary auto truck or interurban bus must do upward of $30 a day in business, or $10,000 annually, or it cannot operate and live. We further know that the personal property tax on each of these buses, its license and the percentage of any gross that may be turned over to the state does not total more than 3 per cent, or $300 a year.

This leaves a difference of 27.75 per cent, which is the subsidy that is being given these trucks that are using our highways for profit and destroying the value of the electric and steam railroads of this country. It is no wonder they can make the short hauls and deliver from business house to business house more cheaply than the freight can be handled by a rail line. But the answer is that it cannot be done if no subsidy of the extent indicated is paid.

Since May 1, 1917, a California statute has required new truck lines to secure a certificate of public convenience and necessity from the State Railroad Commission before service can be established, and at the present time there are operating in competition with the Pacific Electric Railway thirty-five common carriers by truck, operating 130 trucks and trailers. We estimate the revenue they deflect from this company approximates $300,000 per year. There are also numerous "contract" carriers which are not required to file their rate schedules with the commission and we estimate that they deflect an additional $100,000 per year.

As I have already said, the taxpayers did not contemplate that $40,000,000 of the state's money should be put into roads for the pecuniary benefit of individuals or for those who use such investment for their private gain, with the resultant destruction of our highways.

Our State Highway Commission is greatly alarmed at the deterioration of these splendid highways. Our cities are demanding that the damage done to the streets and highways within their limits be maintained out of the fund accumulated through the automobile licenses. Our state officers are greatly perturbed over the lack of revenue that should come to the state from the gross income that should be earned by the rail corporations. Millions of dollars would pour into the state treasury were it possible to tax these automobiles 5¼ per cent of their gross revenue and let it go to the state, as exacted from the rail lines. Some system to accomplish this must be devised.

LEGISLATION RECOMMENDED

Summarizing, we do not ask for anything unreasonable, but we do say:

1. We advocate the repeal of Section 498 of the California Civil Code, which relates to the paving of portions of street occupied by tracks, which would leave

the question of paving to municipalities and the electric railways operating therein. It goes without saying that the day when these rail transportation companies should maintain their paving is past.

2. We feel that an indeterminate franchise act which would repeal the existing cumbersome statutes should be passed by our state legislature. This would lend financial stability to the companies and allow them to proceed with improvements that otherwise will not be undertaken where the conditions of succeeding franchises may be so exacting as not to warrant the expenditure of large sums.

3. We want a fair and reasonable tax on automobile carriers using the highways for commercial purposes, also an amount which would be equivalent to the percentage of gross receipts paid by the rail carriers.

4. The jitney law should be amended so that it will require jitney operators to obtain permits from local authorities before applying to the Railroad Commission for a certificate of necessity and convenience.

5. "Contract" carriers should be placed under the jurisdiction of the Railroad Commission, and all automobile cariers should be required to make full and complete reports of their operations to the commission, as is done by the railroad companies.

6. Urban auto carriers should come under the jurisdiction of the State Railroad Commission, particularly where they operate in competition with interurban systems of transportation.

MOTOR TRUCKS SUITABLE ONLY AS FEEDERS

I do not share the views of the Graham reference to the relative merits of the bus and the electric railway for freight haulage. The electric railway does, and will continue to, handle the bulk of short-haul freight movement. The future will see trucks as feeders to haul freight to central points, thence to be transported to cities by trolley or steam lines. The cost of unloading from trucks and loading onto the trolley freight car, etc., will be more than offset by the higher operating cost per ton-mile of such auto trucks, if we add to the present high operating cost of such trucks approximately 25 per cent, which is a just amount as taxes and interest on investment in the roads that they are destroying. This at first glance may seem large, but if any stretch of the state highways, which have cost as high as $20,000 a mile, is examined and note is made of the destruction, as well as of the comparatively small amount of auto travel which they have carried, it will not be far wrong to say that the damage to these roads will probably reach the astounding figure of one cent a ton-mile.

Mr. Graham would lead us to believe that for such factories, farms, mills, stores and warehouses as are located directly along the lines of rail transportation the railway companies handle only a very small amount of the total freight moved. If he had collected a few statistics he would have found that the great movement of freight goes to and from the great wholesale business houses and factories that have necessarily located on the lines of these transportation companies simply as a matter of economy and business prudence in providing facilities that will give them the quickest, most dependable and most economical method of doing business.

The haulage of freight has become a very great revenue producer for the Pacific Electric and other railroads and will grow, provided the trucks are obliged to charge for their service in proportion to their costs and the damage they do to public property.

SAN PEDRO-LOS ANGELES SERVICE MOSTLY ELECTRIC

Eighty-five per cent of the freight moved from Los Angeles Harbor to Los Angeles is done by the electric line and not by truck, as many seem to believe. The present highway is not congested; it could take four times the truck business it now handles, but the shipping public knows that the facilities cannot be provided alongside a ship that would adequately take care of the great strings of auto trucks that would be required to handle the freight carried by one of the large ocean-going vessels that dock at our far famed harbor.

I firmly believe that freight haulage is a big problem for the electric railroads. Profits of business houses are made by the volume that they handle, and large volume can be handled only in large units. Where the average car can handle 25 to 30 tons of merchandise and 50 to 55 tons of grain in a unit, it is hard to conceive of motor trucks supplanting them. We also know that every first-class and far-seeing business concern is locating its facilities, especially at wholesale points, along railroad lines and building its warehouses and supply depots at such points as can economically handle this volume of traffic.

It is a common daily occurrence on the Pacific Electric Railway to move 100 cars of freight from San Pedro with about 25 tons to the car, or a total of 2,500 tons. If this business was done instead by motor trucks with from 3 to 5 tons capacity, or an average of 4 tons, 600 automobiles would be required to take care of one day's business and operating in but one direction. Such an idea is preposterous. It will never be done.

An interesting side-light on this situation is thrown by the notice, which is reproduced on page 81. This notice was sent to all of its customers by a Los Angeles heavy hardware concern and is of interest.

Austria Planning Electric Railways

NEWS has recently reached this country that the plans for the electrification of about half the railway lines in Austria have been approved. The project covers approximately 400 miles of railway, mostly in mountainous country, and will cost about 5,000,000,000 crowns. The reason for the sudden undertaking of the work projected more than twenty years ago was the breaking up of the old Austria, which was comparatively rich in coal. The present Austria finds itself almost without coal. To reduce its dependence on outside countries for coal, the development of potential water power and railway electrification offer the only solution.

A conservative estimate places the saving through the employment of electricity at 7 per cent of the total outlay, because much equipment for hauling the coal from the Czech frontier 420 miles to the Austrian Alpine roads will no longer be necessary. The development of about 76,000 hp. of water power will be required for the first undertaking of 400 miles of line. Later it is proposed to electrify an additional 680 miles of lines, which will necessitate other developments totaling approximately 150,000 hydraulic horsepower.

Getting the Best Results with Steel Poles

Manufacturer Makes Suggestions to Users Which Show How Special Requirements Sometimes Cause Unnecessarily High Cost—Some Practical Hints on Pole Testing Are Also Given

IT IS highly desirable that the users of a manufactured product appreciate fully the relation of manufacturing processes and characteristic qualities of materials to the finished article which they procure from the manufacturer. To this end such publications as the issue of the "'National' Bulletin," of the National Tube Company, dated 1921, is very useful. A few suggestions from this bulletin are given below.

This company has developed a grade of mild steel that has proved in service especially adapted to the manufacture of welded tubular holes. The average composition of this bessemer steel is carbon 0.07 per cent, manganese 0.35 per cent, sulphur 0.045 per cent, phosphorus 0.1 per cent. The variations permitted are: Not more than 0.09 per cent carbon, 0.065 per cent sulphur, 0.11 per cent phosphorus; while for the manganese the range is from 0.3 to 0.6 per cent.

REGARDING POLE TESTING

The company states that while something may be gained from any test that will show the ultimate strength of a pole, some tests, such for example as the deflection test, are practically useless. Users sometimes claim that flexibility is of advantage in practice, although the specifications contain a clause limiting the deflection of the steel poles to less than is permitted for other materials. In any event the deflection can be calculated with great accuracy.

In contrast with the doubtful usefulness of the deflection test is the effective drop test, which determines whether the joints have been properly and securely assembled. Sectional poles are usually dropped, butt down, three times from a height of 6 ft., on a solid hardwood block supported by a rigid base.

Another practical test is the pulling or pushing test applied in the direction of the pole length. In this test short-jointed sections on several poles are cut out and tried in a testing machine. Tests have shown that many joints will carry, without slipping, substantially a push or pull nearly equal to the load the smaller pipe in itself would withstand.

The steel used for National poles has a minimum elastic limit of 30,000 lb. and the test for yield point is carried out at 10 per cent below that value. The set under this load is measured. Another and quite common flexural test is made when poles are inspected. It is carried out after the manner usually employed in determining the elastic modulus of the material. In this test both load and the corresponding flexure (or deflection) are recorded. It is usually made at the rather high stress of 18,000 lb. per square inch. This is two-thirds of the stress which is used for maximum load.

ALL POLES SHOULD NOT TAKE SAME SET

Many specifications have been drawn up requiring poles of widely differing lengths and diameters to stand the same deflection, commonly 6 in. Now, a pole 22 ft. long made of 13-in. and 12-in. pipe should not be deflected more than about 1 in., while a pole 39 ft. long of 4-in., 3-in. and 2½-in. pipe should be deflected about 18 in. when tested for deflection. It is evident that a constant figure like 6 in. for deflection may be much too large in one case and too small in another. A deflection of 6 in. is about right for a pole 31 ft. long, of 6-in., 5-in. and 4-in. pipe.

Some framers of specifications have attempted to overcome the difficulty by reducing the limit of deflection to 3 in. and some to 1½ in. Against such practice it is proper to urge that 1½ in. would not strain a pole 39 ft. long, of 4-in., 3-in. and 2½-in. pipe sufficiently for the test to give any indication of the quality of the pole. It is more rational to use such load as will produce about a constant stress in the material and then to fix the deflection limit to correspond.

Tubular steel poles are designed for a certain maximum load which may be applied without producing appreciable permanent distortion. The load to be applied should not produce a fiber stress above the yield point, say not over 90 per cent of that for safety. After such loads are applied there usually remains a small fraction as a permanent set, which some specifications have limited to a constant figure, such as 1 in. or ½ in. This constant figure is as inappropriate for set as a constant figure is inappropriate for deflection.

Tests have shown that the set on first loading seldom reaches 10 per cent of the distortion produced by that load. The practical difficulties of making the tests and measures impose a limit to such measures, which for commercial testing of poles is usually agreed on as ½ in. of permanent set. Thus a pole which is deflected 5 in. on test should not show a permanent set exceeding ½ in., but a pole that is deflected 15 in. on test may show a set of 1½ in. without exceeding rational limits.

The length of the sections of a pole has but little effect on strength, stiffness or weight. As long as the size and thickness of pipe remain unchanged, the strength, stiffness and weight do not change by more than approximately 6 per cent.

SPECIAL MANUFACTURING PROCESSES INCREASE COST

The use of odd sizes, thicknesses and weights should be avoided as it involves special production, delay and increased cost. Considerations of strength, stiffness, etc., at times suggest the advisability of such combinations as 4½-in. in 5-in. pipe, but such combinations necessitate assembling in a machine capable of forcing the smaller into the larger pipe. A forcing machine of this kind is expensive to change and such joints should be used only where it will be possible to order a large number of poles identical in dimensions, unless the use warrants paying the extra assembling costs when only a few are made at one time.

When only a few poles are ordered, it is better to use such sizes and thicknesses as will allow the insertion of the smaller pipe to be made by hand, say at least ¼ in. difference in diameter between the outside diameter of the inserted pipe and the inside diameter of the larger pipe. The difference should never be less than 3/16 in. unless the quantity justifies the use of the forcing equipment, say when 1,000 or more identical poles are to be made and shipped at one time.

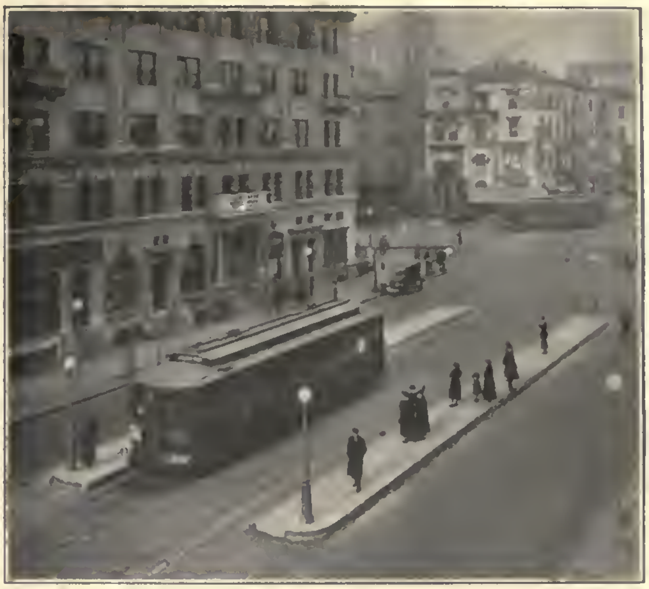
Sometimes considerations of strength, stiffness and limit of least thickness lead to the choice of sizes of pipe that entail great reductions at the joints. These require heavy swaging before assembling. After the poles are assembled, there is great risk of injury to the smaller sections in transit or erection. It is frequently possible to obtain an equal or even a slightly greater strength by the use of larger and thinner pipe for the upper section, and to do this without increasing the total weight appreciably.

To protect the poles near the ground line where deterioration is most rapid, a dog guard may be applied. This is made of a piece of larger and thicker pipe put over the pole from the butt end and swaged and shrunk on so that one-third of the length will be below and two-thirds above the ground line. These guards are applied at red heat. While cooling they shrink tightly. They at least double the life of a pole of extra-heavy type and frequently triple the life of a pole of standard type. Dog guards are usually made 2 ft. long.

Permanent Loading Platforms in Washington

Wooden Structures, Which Have Proved the Usefulness of Loading Platforms in Congested District, Being Replaced by Permanent Type—Construction Conforms to Street Paving

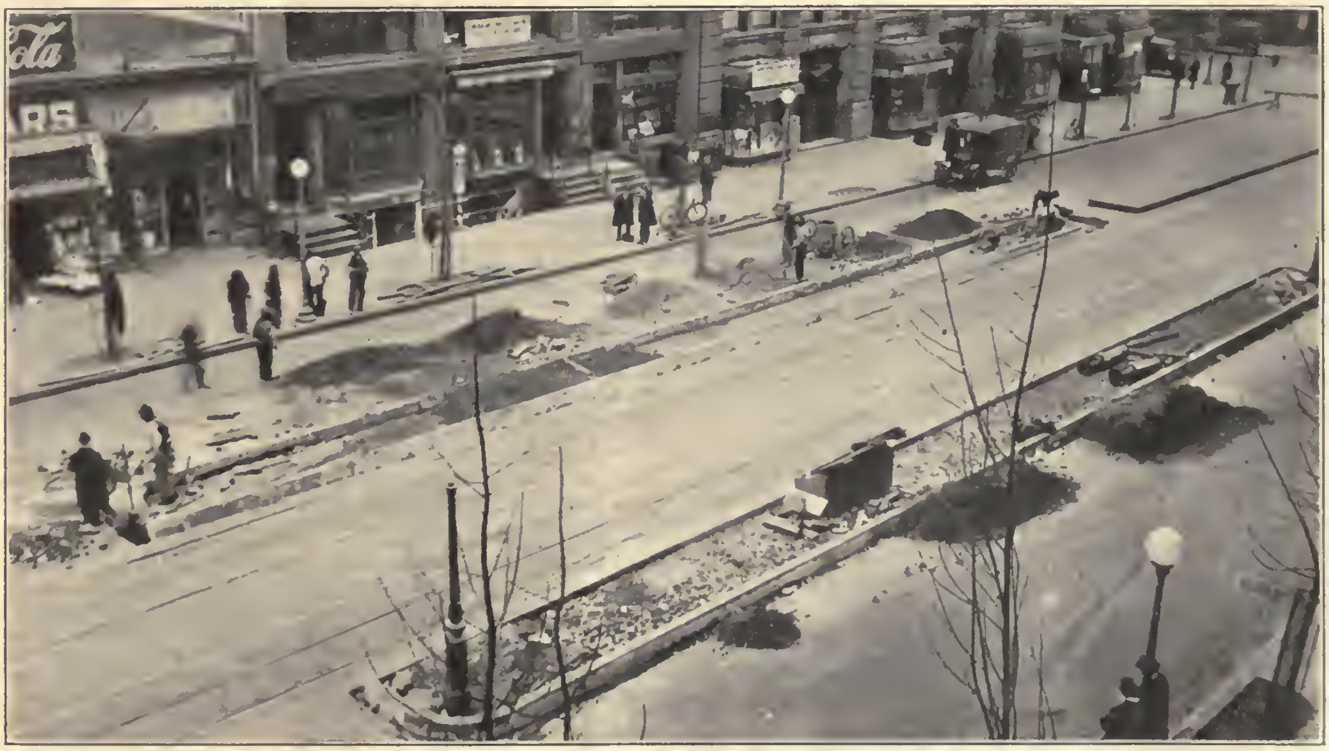
THE highway authorities in the District of Columbia have begun conversion of the wooden loading platforms used for the past two years to a permanent concrete form. The loading platforms in Washington, which were installed in 1918, following the recommendations of John A. Beeler, have given excellent satisfaction from a traffic standpoint. A description of these platforms, with illustrations, was given in the ELECTRIC RAILWAY JOURNAL, May 4, 1918, pages 848 and 849. At the same time an analysis of the skip-stop or rearranged stops in the downtown districts was given. On July 13, 1918, page 64, was given an account of the results obtained in the way of speeding up traffic following the installation of these loading platforms.



COMPLETED LOADING PLATFORM ON FOURTEENTH STREET, SHOWING LIGHTING STANDARDS SIMILAR TO STREET LIGHTING UNITS

The principle of the loading platform has now become so firmly established as a part of Washington practice that the highway authorities have decided to eliminate the wooden platforms and install a more artistic and permanent form. The first pair of platforms converted are about 6 ft. x 96 ft. over all. They are built with a 6 in. x 20 in. granite curb set in the asphalt pavement in the form shown in the diagram. Within the curb a cinder fill is rolled directly on top of the old asphalt and this is topped with about 2½ to 3 in. of surface asphalting similar to the standard paving material used in the District of Columbia.

The lighting of each platform is by two pedestal lamps surmounted by standard series lighting unit and

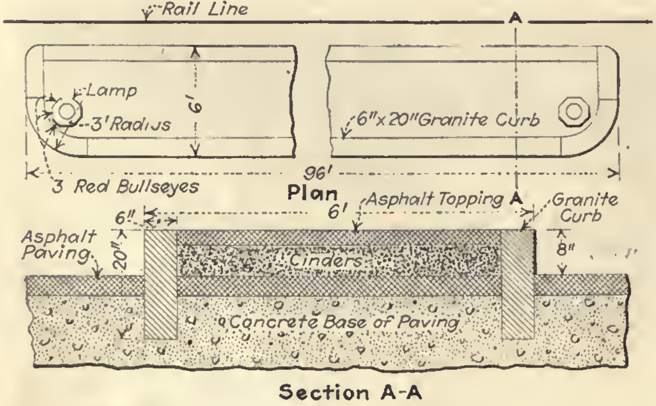


LOADING PLATFORM UNDER CONSTRUCTION, SHOWING RETAINING CURB READY FOR FILL

STYLE OF WOODEN PLATFORM ORIGINALLY INSTALLED IN 1918, NOW BEING REPLACED BY CONCRETE PLATFORMS

with a special low-voltage lamp to light the red bullseyes in the base. The three bullseyes in the base of the lamp are lighted by a single lamp centered on the axis of the post supplied with current at low voltage from the lighting circuit of the nearby alley. It was considered dangerous to have this lower lamp one of the high-voltage series lights similar to that used on the top of the post and for the regular street lighting units. It was argued that the bullseyes might become broken and some one poke in through the open bullseye with an umbrella or metal rod and break the high-voltage series lamp, with possibly serious results to himself through electrical shock.

The base of the lighting unit is a standard octagonal post with red bullseye lenses on three of the eight faces. At the end nearest to approaching traffic the lenses are on three faces toward approaching traffic. On the far end of each platform the lenses are on the three faces most distant from the track. This arrangement offers marker lights to guide an approaching motorist at the near end of the platform and a marker by which he may gage a turn if he wishes to circle about the far end. In other words, as Mr. Hadley, electrical engineer of the district, puts it, "the motorist is guided by a red light from any angle of legal approach." A somewhat similar problem was solved elsewhere in the district by using red bullseyes in five of the eight sides on a lamp on an island of safety at an irregular crossing where numerous possible angles of approach had to be guarded.



PLAN AND SECTION SHOWING CONSTRUCTION DETAILS OF NEW PERMANENT LOADING PLATFORM

The material improvement in appearance of the loading platforms as compared with the old wooden structures is obvious from the two illustrations showing conditions before and after conversion.

What Is an Interurban?

The United States Railroad Labor Board Sets Forth Its Characteristics in Lengthy Decision—Board Rules Adversely on Point of Jurisdiction in View of These Characteristics

A SHORT reference to the decision of the United States Railroad Labor Board handed down on Dec. 18 discussing the meaning of the term "interurban" as contained in Section 300 of the transportation act of 1920 was published on page 1297 of the issue of this paper for Dec. 25. The full text of the decision shows that the board made an interesting analysis of what characterizes an interurban railway before rendering its opinion. The case came before it through appeals from employees on various electric railways asking the board to hear their grievances. The petitioners represented sixteen unions in all and the respondents were the following eleven railways:

Spokane & Eastern Railway & Power Company (Inland Empire Railroad), Inter Urban Railway, Fort Dodge, Des Moines & Southern Railroad, Piedmont & Northern Railway, Lackawanna & Wyoming Valley Railroad, Pacific Electric Railway, Denver & Interurban Railroad, Hudson & Manhattan Railroad, Chicago, Lake Shore & South Bend Railway, New York, Westchester & Boston Railway and Washington & Old Dominion Railway.

In reciting the reasons for the case before it the board said:

Representatives of employees on the electric railways named herein have brought before the Labor Board for consideration and determination disputes between these railways and certain of their employees. All the organizations which are petitioners do not have a dispute with every respondent railway, but each petitioner has a dispute with one or more of the respondents and each respondent has a dispute with one or more of the petitioners. The railway representatives having questioned the Labor Board's jurisdiction, this decision is upon that question solely.

The ground upon which jurisdiction is questioned is that these railways are interurban electric railways not operating as a part of a general steam railroad system of transportation, and that they are therefore excepted from Section 300 of the transportation act, 1920, Sub-section 1 of which is as follows:

"1. The term 'carrier' includes any express company, sleeping car company, and any carrier by railroad, subject to the interstate commerce act, except a street, interurban or suburban electric railway not operating as a part of a general steam railroad system of transportation."

It is clear that Congress intended to exclude certain kinds of transportation facilities from the jurisdiction of the Labor Board. So far as the railways here in question are concerned, if they either are not interurbans or are operated as a part of a general steam railroad system of transportation, then they are not excluded and remain within the Labor Board's jurisdiction.

The eleven railways divide themselves, roughly speaking, into two groups. In one are the Hudson & Manhattan Railroad, the New York, Westchester & Boston Railway and the Denver & Interurban Railroad, which do almost exclusively a passenger business. In the other group are the eight remaining railways, which, in addition to a passenger service, do a more or less extensive freight interchange business with steam trunk lines, carry mail and express, and, in general, perform the same public service as steam lines. In each group are roads which operate equipment jointly with steam trunk lines. They range in size of road operation from the Lackawanna & Wyoming Valley Railroad with 20 miles of road to the Pacific Electric Railway with 600 miles. Several are interstate in their operation.

While no two railroads are exactly alike, they are generally similar as to method of operation and character of employment, except for the Hudson & Manhattan Railroad, whose equipment and operation are similar to that of the Interborough and the Brooklyn Rapid Transit Companies of New York. There are also certain other features characterizing one or more of the railways which, being emphasized by the petitioners to prove that particular railways are within the jurisdiction of the Labor Board, deserve careful consideration. Such consideration will obviate the necessity of presenting in detail the facts about each railway. The points to consider are as follows:

1. That this or that railway is physically an interstate property.
2. That it performs the principal functions of a steam railroad.
3. That its charter permits it to operate either by steam or by electricity.
4. That it has at some time in the past operated by steam.
5. That to a certain extent it operates jointly with a steam trunk line certain equipment and makes certain joint use of track.
6. That its stock is entirely or partially owned by a steam trunk line.
7. That it does a considerable interstate business.
8. That it has received a freight increase from the Interstate Commerce Commission under ex parte 74.

The board then considered these points seriatim, after noting that none of the correspondents is under the same operating management as any general steam railroad system, and that certain court decisions had already declared that the Spokane & Inland Empire Railroad and the Fort Dodge, Des Moines & Southern Railroad were "interurban" roads. This analysis of the eight points showed that none of them was controlling in deciding that a road was not an "interurban" railway. In connection with points 5, 6 and 7, the board also declared its understanding of the words in Section 300 "a part of a general steam railroad system of transportation." This phrase means, it says, operating as an integral part of such a system and under unified control. If there is a physical connection and a common control and the lines are used together as one general system the act would cover and include such a road. But when there is separate control and management, mere contiguity at points of connection or even some common officials would not be a decisive test. If the road is under such separate control that its officials can manage its own business, make its own contracts and regulate its own affairs it is not a part of another.

WAYS IN WHICH ELECTRIC RAILWAYS ARE EXCLUDED FROM ACT

The board points out that interurban electric railways are excluded from the provisions of the transportation act under three heads, namely:

(a) In all matters pertaining to federal control, namely, Section 204-A, "reimbursement for deficits," and Section 209-A, "guarantee to carriers," the exclusion covers an "interurban electric railway which has as its principal source of operating revenue urban, suburban or interurban passenger traffic, or sale of power, heat and light, or both."

(b) In Section 1, Sub-section 22, forbidding extension and further construction without authority from the Interstate Commerce Commission; in Section 20-A, requiring the assent of the Interstate Commerce Commission to the issuance of securities, and in Section 300, giving the Labor Board jurisdiction, the exception is "a street, interurban or suburban electric railway not operating as a part of a general steam railroad system of transportation."

(c) In Section 15-A, dealing with rates, are excluded "interurban electric railways, unless operated as a part of a general steam railroad system of transportation or engaged in the general transportation of freight."

The phraseology used in these paragraphs, the opinion points out, differs to some extent, but the same language is used in Section 20-A and in Section 300, and the board points out that under Section 20-A the Interstate Commerce Commission has not felt itself warranted in assuming jurisdiction over the issuance of securities by interurban roads, including some of those concerned with the present case. The board also points out, as a practical matter, that the granting by the Labor Board of a wage increase without corresponding authority to the Interstate Commerce Commission to raise rates would result in serious complications, that the Labor Board and the Interstate Commerce Commission were clearly intended to be interdependent in this matter and that such intention would be nullified if the Labor Board assumed jurisdiction where the Interstate Commerce Commission was without it.

In conclusion, the board, in declaring that it has no jurisdiction over the respondents, says:

> It is plain that Congress has dealt in discriminating language with interurban electric railways throughout the interstate commerce act and the transportation act, 1920, and has consistently treated them differently from steam lines. Congress has done this because there is a material difference, generally speaking, between steam and electric roads in the matter of equipment, nature of service and standards of employment. With a few exceptions, one service is general, the other is local. The difficulty is that a few electric railways have developed far beyond the original idea of an interurban. They have now come to rival many steam lines in service and size. And still the definition of what is an interurban has likewise broadened, not only by popular conception, but by legal, statutory and executive decree, so that the Pacific Electric Railway, operating upward of 600 miles of road; the Fort Dodge, Des Moines & Southern Railroad, owning 2,400 box and coal cars, and the Spokane & Inland Empire Railroad, crossing state lines and operating passenger and freight trains, are all judicially labeled "interurban." It is difficult, if not impossible, to get away from this definition.

Vibration Due to Electric Locomotive Side Rods

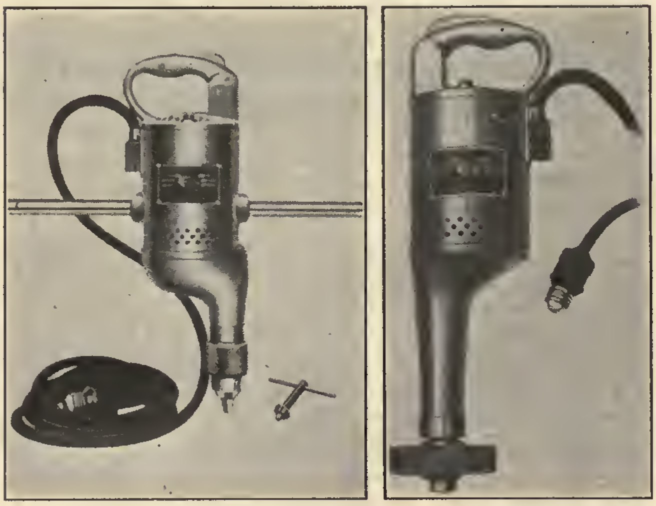
IN AN article in *le Génie Civil* for Dec. 11, 1920, attention is directed to the critical velocity of locomotives of the side-rod type. While the importance of the development of the gearless drive is recognized in the article, the fact is pointed out that for some time to come the greater number of locomotives equipped with one or two large motors coupled by means of cranks and connecting rods with the driving axles must be reckoned with. Examples of this drive are found in the Simplon, the Loetschberg and the St. Gotthard locomotives.

There is for each locomotive a critical speed at which injurious vibrations will be set up, and this is calculable from the mechanics of the oscillating parts. This article gives the method of analysis used by W. Kummer and the results of experiments made by K. E. Müller.

From the experiments made it appears that resonance (the condition for the occurrence of vibration) developed in the following locomotives at the respective speeds given: Valtellina, type 38 of 1906, 40 m.p.h.; Milan-Varese, type 1-C-1 of 1912, 48½ m.p.h.; Loetschberg, type 1-E-1 of 1913, 25½ m.p.h.; Silesia, type 2-D-1 of 1917, 25 m.p.h. When vibration actually occurred on these locomotives conditions were changed so as to eliminate it.

New Line of Electric Drills and Grinders

THE Wodack Electric Tool Corporation of Chicago, Ill., is manufacturing a new line of electric drills, hammers and grinders. Its portable drill is motor driven, using either alternating or direct current, which is automatically shut off when not in use. This is brought about by the use of current contacts actuated through a spring lever in the handle, which is released as soon as the pressure of the operator's grip is removed, much in the same manner as with the dead man's handle used with railway controllers. Wodack drills are made in six sizes, $\frac{3}{16}$ in., $\frac{5}{16}$ in., $\frac{3}{8}$ in., $\frac{1}{2}$ in., $\frac{5}{8}$ in. and $\frac{3}{4}$ in.



PORTABLE ELECTRIC DRILL AND GRINDER

In addition to drills the company is manufacturing a portable grinder equipped with the same style of current control. These grinders are made in three sizes depending on the wheel capacity: 3 in. x $\frac{1}{2}$ in; 4 in. x 1 in., and 8 in. x 1 in. The motors used with both types of tools are made of high grade aluminum and are equipped with SKF ball bearings throughout. The manufacturers claim to have developed a very rugged motor which will stand severe overloading and their guarantee includes repairs and rewinding of motors free of charge should they burn out for any reason within one year from the date of purchase.

Gasoline Substitute for Motor Vehicles

IN A RECENT issue of *Engineering*, London, G. J. Shave gives the results of experiments on omnibuses carried out by the London General Omnibus Company, Ltd., using benzole-alcohol for fuel. The purpose of these tests, he states, was to find a suitable substitute for gasoline. Benzole and gasoline contain about the same number of B.t.u.'s per gallon, but gasoline has the higher calorific value per pound. Alcohol by itself has about half the heating value of either of the other fuels. Compared with gasoline, both benzole and alcohol are slow-burning fuels, and consequently engine design must be modified to suit them. In the first place, compression had to be increased in proportion to the slowness of the burning of the mixture and within the limits of the detonating temperature of the fuel and air mixture.

Elaborate bench tests, made on a standard bus engine with various mixtures of fuel and different carburetor settings, showed that the 50 per cent mixture of benzole and alcohol with 123 lb. compression gave the best results. The whole series of tests showed that the greater the percentage of alcohol the higher are the possible thermal efficiencies for the same compression, and that higher efficiencies are possible due to the allowable increase in compression. However, at low throttle openings, with accompanying low compression, the economy was very poor. The importance of thoroughly vaporizing the mixture by heating cannot be overemphasized.

Due to the presence of water in the alcohol and to its being more volatile than gasoline, some trouble was experienced in starting the motors. An unexpected difficulty arose when, after a bus had been running about a month, the fuel tank and lines were found to have been badly corroded by the benzole. Also a thick tar-like deposit was found on the valve head and in the intake manifold. After the elimination of some of the preliminary difficulties the experiments were successful.

Universal Change Maker

THE advent of the odd-cent fare and the use of metal tickets selling at fractional cent rates have greatly complicated the work of the conductor in making change. The usual form of change maker ejects but one coin at a time, hence with a 6-cent rate of fare in force, it is necessary for the conductor to operate the device four times to eject four pennies in making change for a dime. An improvement on this style of change maker provided for ejecting the four pennies at one operation. This was satisfactory as long as fare remained constant. However, the frequency with which the rate of fare has changed on many properties has made a further refinement in the change maker highly desirable.

Working along this line, the Johnson Fare Box Company, Chicago, has placed on the market a new universal change maker that is adjustable; that is, any barrel may be readily adjusted to eject from one to five coins, or one to six tickets, at one operation. Only a screwdriver is needed to change the adjustment. This arrangement does away with the necessity of discarding a change maker should a new rate of fare require the ejection of a different number of coins or tickets.

The flexibility of the device is further enhanced by the unit construction employed. Each barrel is complete in itself and may be used separately or as one unit of a group made up with whatever number of units are needed to meet local conditions or a conductor's notions. Barrels are designed to handle dimes, nickels, pennies, and metal tickets of two denominations.

The framework and slides are made up of 18 per cent nickel silver, which is exceptionally rigid and will not corrode or tarnish. All parts not subject to wear are made of aero metal to provide increased mechanical strength with light weight.

A new preparation, known as "Meno" Rust Remover and Cleanser, has recently been placed on the market by Peter A. Frasse & Company, New York, N. Y. It is a scientific combination and blending of certain chemical ingredients, which in combination produces an electrochemical action that rapidly loosens and dissolves rust, corrosion, grease, oil, dirt, carbon, paint or any other foreign substance adhering to the metal. Not only are the above virtues claimed by its manufacturer but also that its action automatically ceases when contact between the cleanser and the metal is established.

Soft Metal Bearings

Compositions Containing a Large Percentage of Lead Wear Rapidly, Are Easily Distorted Under Pressure and Do Not Transmit Heat Readily—Practical Limitation of Lead for Car Bearings 15 per Cent

DISCUSSING the properties resulting from different bearing compositions, W. K. Frank, in the *Railway Mechanical Engineer*, says that bearing metals are essentially a mixture, the components of which are distinctly different in hardness. In these metals the softer crystals are abraded faster and develop into depressions, allowing the harder ones to stand above them and support the load. These softer crystals also perform the function of allowing the bearing to be plastic to a limited degree, since fitting is more or less an approximation. As wear is an attendant evil of motion, it is preferable that the bearing wear rather than the shaft, since it is less costly and more easily replaced.

Compositions containing as high as 30 per cent lead find limited application because of their high plasticity and consequent distortion. They answer well the requirement of protecting the shaft, but do not, on the other hand transmit heat readily. They show rapid wear, as is evident to any one who has examined a pile of scrapped railroad car bearings. The high lead bearings can readily be disinguished from the moderately leaded ones by the extent to which the axle collar has worn into the ends of the bearings of the two classes. High-lead mixtures were originally designed to replace the babbitt-lined railroad car bearings, but do not possess sufficient plasticity to accomplish this and are used with babbitt linings. Because of this lining they seldom come in contact with any part of the journal, excepting the collar, and their length of service is determined by the life of the lining, distortion of the back and collar wear.

Mr. Frank also says that as far back as 1892 Dr. Dudley of the Pennsylvania Railroad determined the practical limitation of lead content for car bearings to be in the neighborhood of 15 per cent. Later work on this subject has not altered the conclusions he reached in this respect, and it may be of interest to note that twenty-seven years later a table of railroad specifications shows the net average content of lead to be 15 per cent and that of tin to be 8 per cent. It should be remembered, however, that while the 12½ per cent lead and 15 per cent lead alloys wore more slowly than phosphor-bronze in railroad car bearings, this is not conclusive proof that the lead is in itself a wear-retarding element. Lead furnishes the means of allowing the bronze to conform more readily to varying alignment and, by preventing localized pressures, reduces wear. Under comparatively low pressures and absence of impact, but with changing alignment of car axles, the 15 per cent lead alloy shows superiority, whereas under high pressures and impact the phosphor-bronze shows slower wear. A comparison between the pressures of car axles of 325 lb. per square inch and that of 3,500 lb. per square inch encountered in rolling mill practice shows why such alloys are unsuitable for the latter condition.

Moving Day for Catenaries

WHEN a wheel broke on an eastbound freight train on the main line of the Pennsylvania Railroad recently, about a thousand yards west of Wayne Station in the Broad Street-Paoli electrification zone, twenty-three loaded coal cars were scattered over the four tracks. The services of four cranes, two at each end of the wreckage, were required for thirteen hours before one track could be restored to service.

THIS FREIGHT WRECK ON THE P. R. R. WAS DISTURBING TO THE OVERHEAD

BUT THE OVERHEAD, AT THAT, SUFFERED LESS THAN THE RAILS

The work of removing the entangled wreckage was somewhat impeded by the 11,000-volt overhead contact system, as it was necessary to raise large cars within a very limited headroom. However, two of the four tracks were cleared from the overhead obstruction as shown in the illustrations. The wreck occurred at a sharp bend in the right-of-way. The messenger cables were detached from the cross catenary suspensions at the insulators and the contact wires with their messengers were allowed to straighten out, thus reducing the tension in this part of the system and at the same time grouping all four of the contact wires over two of the four tracks. This resulted in increased working space on one side of the right-of-way without appreciably reducing the headroom on the other side.

A peculiar freak of this wreck was the fact that the relatively delicate electric equipment was scarcely damaged, while heavy steel rails were torn completely free from the crossties.

ELECTRIC RAILWAY PUBLICITY

Devoted to How to Tell the Story

More Comment on Railway Movie

Advantages Measured by Cost

THE CAPITAL TRACTION COMPANY
WASHINGTON, D. C., Dec. 23, 1920.

To the Editors:

I have read with much interest the editorial suggestion in your issue of Sept. 25, and also the comments made by the JOURNAL and in various letters which have been published since that time by prominent men.

No one nowadays questions the value and necessity of bringing before the people the real situation of the street railway business. My own thought is that while all of the various publicity methods and policies are good, the most important thing is to make sure that the public knows all the facts in relation to the operation of the properties.

I do not feel competent to make a statement on the value of publicity through the movies, but believe that specific local problems could very advantageously be covered in this way if the expense is not too great.

J. H. HANNA, Vice-President.

"First, Catch the Hare"

DETROIT UNITED RAILWAY
DETROIT, Dec. 23, 1920.

To the Editors:

Assuming for the moment that film publicity would be an excellent vehicle of expression for street railways, comes the problem of how are the pictures, when made, going to be displayed?

First, catch the hare. It is not by any means certain the houses will show them in the form you desire. Getting them made and having them shown are entirely different propositions.

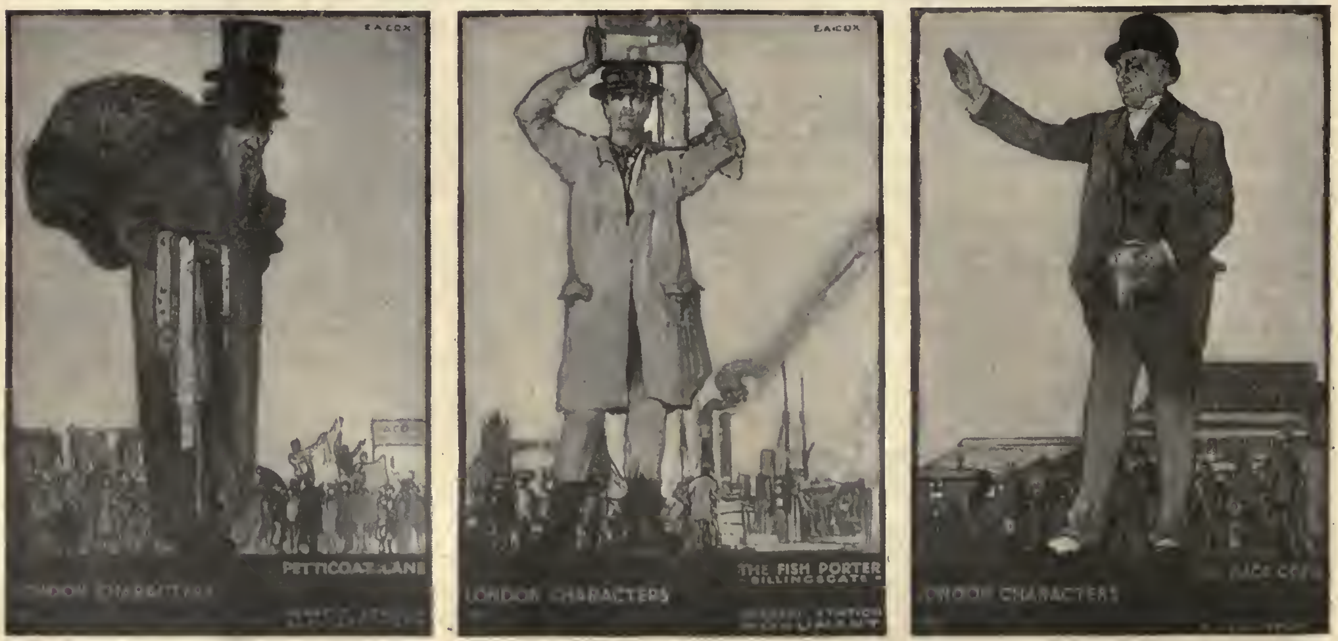
It should not be forgotten that in nearly all communities motion picture houses operate under municipal licenses, and it takes no stretching of the imagination to realize that any group of picture places will prove gun shy for fear of offending the municipal authorities and, as a result, jeopardizing their rights to operate. This I know to have been the experience not more than a million miles from here.

All this is aside from the very debatable question if people want to be instructed when they go to be entertained.

A. D. B. VAN ZANDT,
Publicity Agent.

Attractive Posters from London

THE London Underground Railway system was the pioneer company to use traffic posters on a large scale, and the pamphlets, posters and other traffic literature issued by this company still represent the high mark in electric railway publications of this kind. Reproductions have been published in previous issues of this paper of a number of the posters, pages from the traffic pamphlets and other publications of the company to illustrate the wide variety issued, and the accompanying illustrations show six typical posters recently published. The three reproduced on this page belong to what is known as the "character" group. That is to say, they represent individuals supposed to be characteristic of the underground stations whose names appear on the posters. The three posters on the opposite page are of a different nature and represent characteristic scenes of resorts reached by motor, tram or underground, all three systems being operated in conjunction.



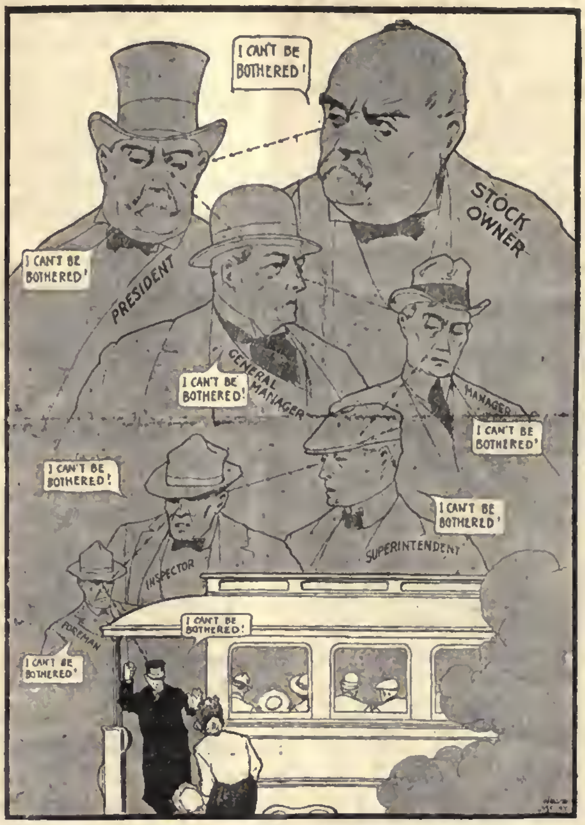
THE LONDON UNDERGROUND USES THESE NOVEL "CHARACTER" POSTERS

How Bad Relations May Be Promoted

IN THIS department of the *Electric Railway Journal* many articles have been published on how to promote good relations between a utility and the public. The accompanying reproduction shows how bad relations between a utility and the public which it serves may be developed through what was evidently an unfortunate selection by a cartoonist of a subject to illustrate a good editorial idea. The cartoon is from the Washington (D. C.) *Times* for Sunday, Dec. 5.

The picture shows the "stock owner" and each official of an electric railway company, from president to platform man, as being indifferent to the comfort of the public. The "stock owner," a corpulent and plutocratic man, throws this duty on the president, saying, "I can't be bothered." The president repeats the same message to the general manager, and so on down the line. Finally, the conductor refuses to help an old lady with a child upon the car.

The text of the editorial accompanying the cartoon bears no evidence that the editor considers the attitude illustrated in the picture is characteristic of the average electric railway. It urges efficiency, attention to duty and individual responsibility upon every member of every business organization—a very good message. Nevertheless, the reader who only glances at the page might easily gather the conclusion that, in the opinion of the editor, the scene pictured is characteristic of electric railways.


I CAN'T BE BOTHERED!
STOCK OWNER
I CAN'T BE BOTHERED!
PRESIDENT
I CAN'T BE BOTHERED!
GENERAL MANAGER
MANAGER
I CAN'T BE BOTHERED!
I CAN'T BE BOTHERED!
I CAN'T BE BOTHERED!
SUPERINTENDENT
INSPECTOR
I CAN'T BE BOTHERED!
FOREMAN
I CAN'T BE BOTHERED!

Cartoon from Washington "Times" showing "I can't be bothered."

Cartoon copyrighted 1920, International Feature Service, Inc. Great Britain Rights Reserved. Reprinted by Permission.

During the last four or five years utilities have had to contend against many difficulties in the way of high prices of all supplies used by them — conditions brought about by the war. These conditions may be considered as unavoidable, being worldwide. It is most important for newspapers and cartoonists not to make the work of utility rehabilitation more difficult by exciting unwarranted prejudice. We hope that the next time Mr. McCay wants to use an electric railway simile to illustrate an editorial on organization he will give a pleasanter expression to the officials and have them repeating to each other some such expression as "the public be pleased." The caption for such a cartoon might be the opening words of the code of principles adopted by the American Electric Railway Association in 1914: "The first obligation of public utilities engaged in transportation is service to the public."

Here is another suggestion as to how Mr. McCay might have made his picture of an electric railway organization more true to life. It is in connection with his portraiture of the "stock owner." Statistics of the proportion of electric railway securities held by men, women, estates, savings banks, insurance companies, charitable institutions and the like for the entire country are not available, but they have been compiled in a few cases, as in Brooklyn. The recent report by Stone & Webster on the Brooklyn Rapid Transit System gives these figures for that property, and there is no reason to believe that the percentage in that case would vary greatly from the percentage on other property. The figures given in that report cover the ownership of all of the securities of the Brooklyn Rapid Transit System, including the securities of the Brooklyn City Railroad and the Prospect Park & Coney Island Railroad, leased lines.

Of the total of 23,985 holders of these securities, 7,247 were women and estates, and 2,034 were fiduciary and philanthropical institutions of the type mentioned. A later report of the Brooklyn City Railroad shows that of its 1,472 stockholders more than a half were women and of the remainder more than 28 per cent were administrators, executives, guardians, life insurance companies, charitable institutions and colleges.

Our suggestion to Mr. McCay, then, in his next picture of a railway organization, is to substitute as a typical stock owner, for the plutocratic looking man in the upper right-hand corner, the old lady now shown at the bottom of the group.

Here is still another idea for Mr. McCay. In his next cartoon, let him show how important the railways are to the social and business life of the community. Then let him point out the lesson that, for this reason, the authorities should adopt a constructive policy in dealing with them

ATTRACTIVE COLORED POSTERS OF RESORTS REACHED BY LONDON UNDERGROUND

Gaining Public Confidence

CO-OPERATION with the city authorities to accomplish a real idea in creating good will for the railway company and at the same time performing a service to the community is one of the recent accomplishments of Dan Fisher, assistant to the president of the Dallas (Tex.) Railway Company. Mayor Wozencraft of Dallas conceived the idea of having a children's day at the Great Fair, at which every child in Texas should be invited as the Mayor's guest, and Dan Fisher saw an opportunity to do something big for the community in this connection. How he accomplished it is indicated by the following editorial, which appeared the day after Children's Day:

DAN FISHER AND THE MAYOR AS ENTERTAINERS

> Pin a medal on Dan Fisher. Hand a bouquet to Mayor Frank W. Wozencraft!
>
> The boys and girls agree that Children's Day at the Texas State Fair was an unqualified success and that for the pleasure it afforded them they owe a debt of gratitude to these two.
>
> The conception of a children's day on which every child in Texas should be invited as the Mayor's guest, free street car tickets furnished, free everything, almost, is one of the biggest ideas that the Mayor has ever sponsored.
>
> And no more able lieutenant to carry out the details could have been found than Dan Fisher. Fisher went from town to town in North Texas passing out the free tickets and telling the glad news through the public schools, and where he couldn't go, he sent.
>
> We doubt that ever before in one gathering have so many children come together.

From information since obtained, it appears that there were 150,000 children attending the fair that day, a large part of them being carried upon the lines of the Dallas Railway. Private automobiles, buses and trucks were also pressed into service. The handling of such a great crowd, particularly children, was something which probably never before had been done by a state railway in the United States in a city the size of Dallas, at least.

The spirit with which Mr. Fisher entered into the proposition is indicated by the accompanying photograph, where he and Mayor Wozencraft are surrounded by some of the children they made happy.

A "Tickler" for the Public

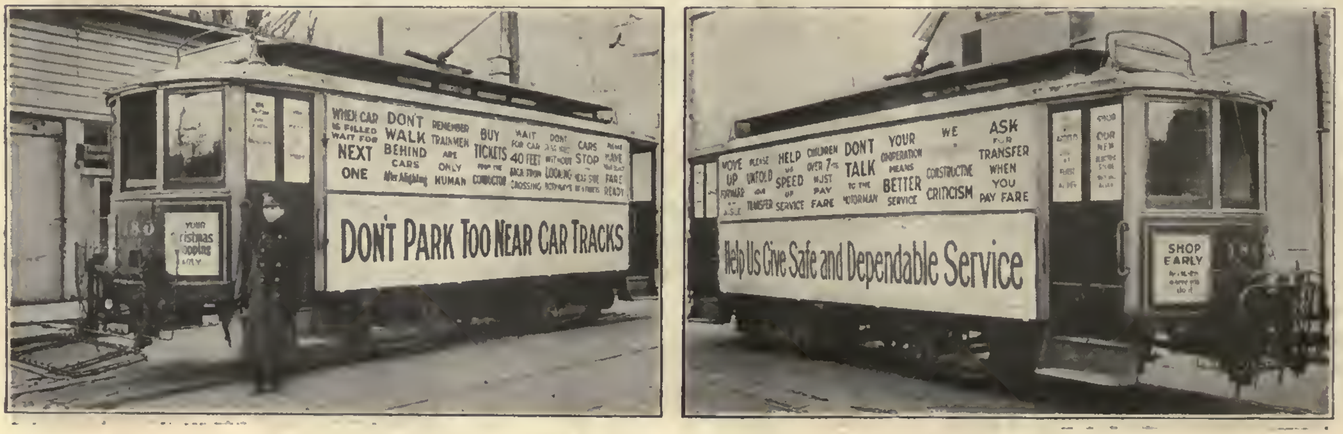
WHEN an efficiency engineer wants to speed things up a bit and make the organization "get a hump" on, he sends out a "tickler." W. B. Strandborg, publicity man of the Portland Railway, Light & Power Company, Portland, Ore., has adopted that same idea and put it on wheels, and the company is now operating a "Trolley Tickler on Wheels," over all the streets in the congested down-town district during the busy hours of the day.

The car is a converted one-man car and is completely smothered and surrounded by cute and gaudy banners, signs, cards, etc. Some of them are slogans to arouse interest in the educational campaign of the National Safety Council, some had to do with early Christmas shopping in the Christmas season, and others relate to "Service Suggestions" to help speed up service through co-operation on the part of the traveling public.

There are two large banners, one on each side along the body of the car, reading: "Don't Park Too Near Car Tracks," and "Help Us Give Safe and Dependable Service."

There are sixteen smaller signs covering the car windows and a set of four smaller cards appear on each end of the car. The accompanying illustrations show both sides of this trolley "tickler" and the ingeniously worded signs which are used. Of timely Christmas interest were the four dash sign cards on early shopping. These cards are to be changed from time to time.

The "tickler" attracted widespread attention and interest from the start and the company plans to keep it in permanent operation. The banners and cards are on cream-colored oil cloth with black and red lettering and can be read from a considerable distance.


WHEN CAR IS FILLED WAIT FOR NEXT ONE
DON'T WALK BEHIND CARS
REMEMBER TRAINMEN ARE ONLY HUMAN
BUY TICKETS FROM THE CONDUCTOR
CARS STOP
FARE READY
DON'T PARK TOO NEAR CAR TRACKS
HELP US SPEED UP SERVICE
CHILDREN OVER 7 MUST PAY FARE
DONT TALK TO THE MOTORMAN
YOUR COOPERATION MEANS BETTER SERVICE
CONSTRUCTIVE CRITICISM
ASK FOR TRANSFER WHEN YOU PAY FARE
Help Us Give Safe and Dependable Service
SHOP EARLY

TROLLEY TICKLERS ON WHEELS ARE EFFECTIVE IN PORTLAND, ORE.

Determining Physical Characteristics of Steel Rails by Magnetic Analysis

THROUGH the efforts of several steel experts who recognized the great practical value and immense possibilities of magnetic testing to the metallurgical industry, an apparatus has been perfected and placed on the market which enables one to establish the relation between the magnetic and mechanical properties of called the Burrows magnetic analyzer, is now obtainable steel and detect imperfections. Such an, apparatus from Holz & Company, New York.

The principle on which this analysis is based is that there is but one set of mechanical conditions corresponding to every set of magnetic characteristics. There are two separate analyses made, one using a magnetoscope, which gives information about the composition and mechanical and heat treatment of the specimen, but does not give any indication of the existence of flaws, and the other, the defectoscope, which determines whether non-uniformities exist, but does not indicate whether or not a specimen is hard or soft. The analyzer consists of a magnetizing solenoid wound on a brass tube, inside of which is a test-coil unit conforming as nearly as possible to the section of the specimen. The unit consists of two coils of fine wire having an equal number of turns and connected with ballistic effects opposed. This outfit, which surrounds the specimen, is driven at a constant speed along it and whether used to analyze quantitatively or to detect imperfections depends on the connections and circuits, for which two separate control boxes are furnished.

Magnetic surveys and analyses, it is claimed, will furnish information impossible to secure by any other means of testing. The fact that materials can be tested without destruction is of prime importance, and it is this feature of magnetic analysis which makes it possible to find in advance those rails which, after injury under straightening presses, would develop in service a complete interior transverse fissure. It is also suggested that this test would eliminate the occasional defective rail before it leaves the mill or is put in the track.

Automatic Control of Humidity in Shops

THE United States Forest Products Laboratory has developed a plan for conditioning the air in shops, particularly for woodworking shops, although it is applicable elsewhere.

The apparatus consists of a small cabinet, or chamber, through which the air is drawn as often as it needs to be conditioned. The conditioning chamber contains water sprays whose temperature is kept constant by a mixing valve. These sprays suck in the air by their own action, cool it to the temperature at which it should be saturated and give it all the moisture that it can hold.

As the air leaves the chamber it is heated to room temperature by coils, whose steam supply is controlled by a thermostat located in the outlet. Thus, when the air is drawn into the chamber, it may be too hot or too cold, too moist or too dry, but the apparatus automatically humidifies or dehumidifies it and brings it to the correct temperature before allowing it to pass again into the room. Both in the storage rooms, where the air needs conditioning very infrequently, and in the workrooms, where it is completely changed every ten minutes, the recording instruments show that the atmospheric conditions have varied to only a slight extent throughout a three-year period.

Drawings of the apparatus and further details concerning its installation and operation may be had on application to the laboratory at Madison, Wis.

Association News

Transportation to the Mid-Year Conference

ARRANGEMENTS are under way by the committee on transportation for special Pullmans to the Chicago conference on Feb. 10.

The committee believes it possible to arrange for special cars from Detroit, St. Louis, New York, Boston, Cleveland, Philadelphia, Baltimore and Indianapolis. R. B. Fisher, chairman of the committee, has made the following assignments: D. W. Smith is to canvass Detroit and vicinity; Col. A. T. Perkins and F. O. Grayson, St. Louis and the southwest; C. R. Ellicott, New York City; A. F. Walker, New England, and if the proposed trip from Boston to Chicago via Montreal is undertaken, Montreal as well; Paul Wilson, Cleveland, Buffalo, Toledo and intermediate points; A. H. Englund, Philadelphia and Pittsburgh, and R. B. Fisher, Peoria, Columbus, Louisville, Indianapolis, Cincinnati, Evansville, etc.

All those planning to attend the conference are urged to get in touch with the men assigned to their home territory with the view to joining with others and making special reservations possible.

December Reports Available

THE following special reports and compilations have been prepared by the Bureau of Information and Service during the last month:

Record of All Increases in Rates of Fare in Cities of 25,000 Population and Over from 1917 to Date.—This compilation shows all fare increases that have occurred classified by calendar years in each of these cities.

Trackless Trolleys.—Summary of replies to association's questionnaire sent to foreign companies, describing types of equipment, operating conditions and costs.

Analysis of Agreements with Trainmen.—This covers a number of the larger electric railway companies and is a comparison of the working conditions relating to hours of labor, extra compensation paid under various circumstances and limitations in the making of schedules and time tables.

Owl or Night Car Service.—Based on replies to questionnaire, showing rates of fare, frequency of service, percentage of system included, and comparative financial results.

List of Cities Having Increased Rates of Fare as of Jan. 1, 1921, Summarized on the Basis of the Cash Rate of Fare.

In addition to the above, the bulletins on trainmen's wages and cost of living have been brought up to date by means of supplements.

Any of the above compilations will be forwarded to member companies upon request.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Wage Discussion in Detroit

Trainmen Continue Negotiations—Officers and Other Employees Reduced Jan. 1

The first of the series of conferences between the officers of the Detroit (Mich.) United Railway and its platform employees to consider the company's proposed reduction in wages was held in the company's offices on Dec. 28. It has been intimated that arbitration on the disputed points and a referendum vote of the men on the wage question would be acceptable. Further conferences will be held.

In a letter signed by officials of Divisions 90, 111 and 26 and the Monroe Branch of Division 26 of the Amalgamated Association the request is made that the company adhere to the terms of the wage contract. The division associations have specific contracts with the company covering the question of wages. These do not expire until May 1, 1921. This fact is pointed out in the letter to the company. It is also contended that after the men agreed to the wage settlement in May, 1919, covering that year, the cost of living kept increasing with the result that the wages agreed to, in a short time after their acceptance, were not sufficient to meet the cost of living during the remainder of the year. The men claim that they lived up to their contracts with the company while suffering losses to themselves and families and now appeal to the company to carry out its part of the agreement.

Replying to the company's intimation that the subject has not been fully submitted to the men employed by the company, it is stated that the representatives would be willing to prepare a circular clearly explaining the propositions the company has made and the replies that have been made by the committee, and submit them to a referendum vote of the membership of the divisions and to abide by the majority vote.

Relative to arbitration of the matter, it is stated that the existing agreements provide how disputes shall be arbitrated. The only question is whether the company has the right to set aside the written contracts that exist. That question the committee members are willing to arbitrate.

QUICK ADJUSTMENT NECESSARY

The Detroit United Railway states that, fully alive to the conditions in which the company finds itself, executive officers, heads of departments and workers within the departments are co-operating to practice every economy possible. They have accepted decided reductions in salaries and wages beginning Jan. 1. The conferences with representatives of the several organizations of motormen and conductors have been arranged with the same end in view, that increases granted to meet the growing costs of living may be voluntarily relinquished in part and to such an amount as to have a material bearing in permitting the company to continue without cessation of its service to the public. It is stated that any adjustment other than a speedy one would be detrimental to the community.

Railway Legislation Likely in Iowa

The Legislature of Iowa meets during the present month for its biennial session. It is expected that the lawmakers will take notice of the present difficulties existing between Iowa municipalities and electric railways. At present there are known to be at least four railway measures which will be introduced in the General Assembly.

Officials of the Iowa League of Municipalities announce that their organization is interested in at least three such bills. One of these measures delegates to cities the right to fix rates of fare in traction franchises. This bill will be introduced only in the event that the decision in the Ottumwa street railway case is reaffirmed when it comes up for hearing late this month.

Another measure will prepare for permissive legislation allowing cities at their own election to relieve traction companies from paying for paving between tracks.

Still another bill will cover the jitney question and would allow cities the right to grant franchises to bus companies under which the companies would be assured of contract protection over a period of years. It is frankly admitted by the backers of this measure that it is a club to hold over the electric railways. At the present time companies operating bus lines are given no assurance of protection.

Backers of a fourth bill propose that electric railway extensions be financed by special assessments against the property in the territory to be benefited. The theory back of both this bill and the one which would require the property owners to pay for the paving between the tracks in front of his property is that the general taxpayer should not be assessed for neighborhood improvements, but that the property owner who is benefited should share the expense. The tendency of late years has been to relieve the general taxpayer of expense which covers benefits of a local character.

Valuation Act Protested

New Jersey Commissioners Recommend Recent Law Be Amended to Give It Review Power

The annual report of the Board of Public Utility Commissioners of New Jersey, a summary of which was made public on Dec. 29, refers to the increases in fares recently proposed by the Public Service Railway and in this connection discusses the act passed by the Legislature of this year providing for the selection by the Governor, State Treasurer and State Comptroller of a firm of engineers to value the property of the electric railways.

LIMITATIONS OF BOARD

The report states that, as the act requires it to accept the report of the engineers as to the value of the property in any rate proceeding, the board will be powerless to exercise any independent judgment as to the value. It cannot give consideration to the estimates of value, exhibits and testimony submitted by experts employed by the board, the associated municipalities and the company. The board recommends that the law be amended so it may give due consideration to the engineers' report and other information helpful in arriving at the value of the property.

During the year, owing to the difficulty of obtaining coal on contract deliveries; its high cost; the expiration of contracts for oil, and the inability to renew contracts except at greatly increased prices, all the gas companies in the State have been adversely affected. Companies whose bonded indebtedness is less than the fair values of their properties have been unable to meet operating costs and fixed charges.

The question with respect to such companies has not been what rate will meet operating costs, provide for depreciation and pay a reasonable return on the fair value of the property; but what rate, if any, can be fixed which will enable the utility to continue to supply service at a price commensurate with its worth.

EXPEDITING LOADING SUCCESSFUL

The inauguration of a system whereby tickets or cash receipts are sold during the afternoon rush hours at two ferry terminals of the Public Service Railway, thereby speeding the loading of cars, has improved service, and the same method recently adopted at several heavy points in Newark, the board states, bids fair to be successful.

During the year approximately 150 one-man cars have been put in operation by the Public Service Railway and forty by the Trenton & Mercer County Traction Corporation.

Many Suggestions for Relief of Electric Railways

Public Utilities Commission of Connecticut Presents to Legislature Constructive Document Recommending Aid to Railroads and Corporate Reform—Federal Report Quoted

The Public Utilities Commission of Connecticut on Jan. 5 sent to the General Assembly a report of its inquiry into the electric railway conditions under an act of the 1919 session in which it makes many suggestions for legislation to relieve these companies.

An outstanding recommendation is that the Attorney-General be authorized to ask the federal court to vacate a judgment against the New York, New Haven & Hartford Railroad by which the Connecticut Company was taken from the railroad and placed in the hands of federal trustees. The electric railways might then be returned to the New Haven road, as it is a Connecticut company, doing a state business solely, and have the corporate stock and control vested where it was before.

CORPORATE REFORM URGED

Suggestions for corporation and managerial reforms include: Division of the system into well-defined operation parts under competent managers; separation of operating revenues and expenses of each division; greater attention to routing of cars and maintenance of schedules; supply auxiliary motor vehicles in chartered territory; increase the number of one-man cars in urban service; closer attention to heating and sanitary conditions in cars; greater publicity in operating and financial conditions; closer touch with local conditions; closer co-operation with city officials; quicker movement of cars; obtain co-operation and not antagonism of the public; stricter observance of courtesy; prompt correction of defects and annoyances.

Recommendations for legislative consideration include plans for relief to the companies from statutory obligation on paving, bridge maintenance, etc., to a considerable extent; relief from highway bridge construction and maintenance; extension of time in which to pay taxes due to the State; authorizing municipalities to subsidize local lines, etc.; to operate motor vehicles.

It is recommended that jitneys be declared common carriers and regulated as such, and that municipalities be vested with jurisdiction over jitney routes, schedule and supervision.

Recognition is given in the report to the work of the Federal Electric Railways Commission, and the opinion is expressed by the commission that the benefit of that investigation and report should not be overlooked in the report made by that commission. The Connecticut Commission then quoted certain conclusions and statements by the federal body believed to be applicable to the situation in Connecticut. One such statement was to the effect that "the electric railway furnishing transportation upon rails is an essential public utility and should have the sympathetic understanding and co-operation of the public if it is to continue to perform a useful public service." The Connecticut Commission then quoted from the federal report in regard to credit, the distance tariff or zone system and jitney bus competition.

The commission did not deem it expedient at this time and in its report officially to decree its concluded fair value of the companies' property for rate making purposes, based upon the different valuations or indices of value submitted, other than to state that such valuation as of this date would undoubtedly equal or exceed the minimum figures submitted, after making due allowance for depreciation. The following table shows the valuations obtained by the commission for the Connecticut Company's owned and leased lines:

	Valuation, 1910-1914	Valuation, 1919	Historical Cost, 1919
Connecticut Company owned lines	$36,135,897	$65,044,614	$41,011,815
Connecticut Railway & Lighting Company lines leased to Connecticut Company	15,781,829	28,407,292	19,741,537
Connecticut Company owned and leased lines	$51,917,726	$93,451,907	$60,753,352

The commission said in part:

The success of any utility company depends largely upon the character, efficiency and progressiveness of its corporate management. It is necessary that the company, through its officers, should obtain and retain and merit the confidence and goodwill of the public. If this valuable and essential asset is lacking the corporate management should immediately become exercised, and scrutinize its own conduct, and overcome the defect as far as possible, even if necessary to change the personnel of such management to effect such result.

From numerous public hearings and investigations had, pertaining to Connecticut Company matters, the commission is led to the conclusion that the general public does not possess that degree of confidence in the officers and managerial policies of the company which best results require. We say this without intending to cast undue aspersions upon any of the officers of the company, but as a statement of existing conditions, affecting the public welfare.

The lines of the Connecticut Company are divided into operating divisions, each in charge of a manager or superintendent who reports to the vice-president and general manager of the company. Local managers and superintendents are given but limited authority over the operation of their respective divisions. Many matters other than those of minor importance, and which should be decided promptly in order to accommodate the public and render efficient service, must be referred to the general manager or other superior officer at the central office in New Haven. We believe this condition should be remedied, and that local managers or superintendents should be given greater authority and held responsible for the proper conduct of business in their respective territories, as far as operation is concerned.

Owing to economic conditions and a series of events extending down from its early organization and development to the present time the electric railway industry in Connecticut, metaphorically speaking, has become and is a very sick patient, and it is not expected that the remedies administered at this time will immediately transform the patient into a sound, healthy and prosperous being. We believe, however, that its weakened vitality is sufficiently strong to respond to curative remedies, and, when such remedies are administered, that its own recuperative forces, wisely exercised, will enable it to return gradually to a sound, healthy and efficient operating condition.

The commission does not favor or recommend at this time government or municipal ownership, particularly in view of the complications that would now be involved in bringing about such a result.

The commission does not recommend the so-called "service-at-cost" plan, advocated by some railway experts and others as being the sole and only reasonable policy for the benefit of the people and the salvation of the electric railway industry. This plan contemplates a rate which will produce sufficient revenue to pay all operating, fixed and overhead charges and a guaranteed return on the value of the property. It makes dividends a fixed charge, thereby increasing the absolute obligations of the company.

Theoretically, private ownership and operation of a public utility, with public regulation, is on the service-at-cost plan, but practically, when a utility company, through unavoidable circumstances, mismanagement, or other cause, is unable, with a reasonable rate, to obtain sufficient revenue to pay its operating expenses, taxes, and a fair return on the value of the property, the investors in the enterprise must stand the burden of the reverses. Possibly it is unfair to make invested capital stand all the burden, but it would be equally unfair to guarantee a fixed return on the capital or value of the property and make the public bear all the burdens of business reverses which might, in a measure, be due to corporate errors of extravagance.

A guaranteed return has a tendency to lessen the incentive on the part of the officers of the company for improvement and greater efficiency. Any policy, which immediately transposes a near bankrupt concern into a 6 or 8 per cent dividend-paying business, must of necessity increase the rates to the public.

We believe that electric railway service is a public necessity, and in the rendition of such service for the benefit of the public the company should be relieved of all unnecessary burdens, destructive competition, and too heavy taxation, which ultimately the car-riders have to bear. As a necessary industry, relieved as far as possible of public burdens and unfair competition, it should be self-sustaining from its traffic revenues, and present an inviting field for new capital required for extensions and betterments.

Certain corporate and managerial reforms can be effected without special legislative enactment, and we have, therefore, divided this subject into two groups.

Suggestions as to reforms contained in the commission's recommendations follow:

1. (Applicable to the Connecticut Company). Divide the company's entire system into a suitable number of specifically defined operating divisions (not more and preferably less than the present number of divisions), each in charge of a competent manager.
2. Give each division manager authority and full power to act on all matters pertaining to the efficient operation of cars, and hold him responsible for the successful operation of his division.
3. Keep the accounts pertaining to operating revenues and expenses of each division separate.
4. Give greater attention to the routing of cars and maintenance of schedules.
5. Obtain accurate information relative to non-paying lines and (provided legislative authority is granted) substitute and develop motor-vehicle service wherever and whenever practical on such lines; also supply auxiliary motor-vehicle service in chartered territory when necessary.

6. Increase the number of one-man cars for urban service.

7. Give closer attention to heating, ventilating and sanitary conditions of cars.

8. Give greater and constant publicity to the operating and financial conditions of the company.

9. Keep in close touch with local conditions and requirements, and try to obtain the co-operation and not the antagonism of the public.

10. Endeavor to obtain closer co-operation of city officials in relieving congestion, and for the more expeditious movement of cars.

11. Enforce strict observance of courtesy on the part of employees to the company's patrons.

12. Promptly investigate and correct minor defects and annoyances affecting the comfort and spirit of co-operation of the traveling public.

13. Always bear in mind the fact that the rendition of street railway service is primarily for the benefit of the public, rather than for the profit of the stockholders or to satisfy the demands of employees when detrimental to economical and efficient operation.

Recommendations for legislation contained in the commission's report follow:

1. That street railway companies be relieved from present statutory obligations of paving, surfacing and maintaining public highways used in street railway operation, excepting that portion of the highway next to and within 8 in. alongside of each rail.

2. That street railway companies be relieved from contributing toward the expense of construction and maintenance of highway bridges over which their tracks cross, excepting that portion of the expense involved in the company's own construction and maintenance, which shall be paid for in full by the company.

3. That payment of present unpaid taxes due to the state from street railway companies be extended over a term of years without interest, and that all future assessment of taxes against street railway companies be levied on net operating income, obtained under honest, efficient and economical management, instead of on gross revenue as at present.

4. That street railway companies be permitted to abandon non-paying lines or portions of lines, subject to the approval of the Public Utilities Commission after public hearing.

5. That municipalities be authorized to enter into contracts of guaranty with street railway companies, affecting gross or net operating revenues; also to subsidize or otherwise take over the control and operation of non-paying lines of street railways within their respective corporate limits.

6. That street railway companies be permitted and authorized to operate automobile buses or other form of approved street transportation, through and along highways over which they operate street railway service, either as substitute for or auxiliary to such service; also to operate such buses or other approved form of transportation over and along adjacent and additional highways and routes, upon finding by the Public Utilities Commission, after public hearing, that public convenience and necessity require such operation and form of public service; the operation of such buses in all cases to be common carriers and subject to the regulation and supervision of the Public Utilities Commission and the laws pertaining to motor vehicles and drivers of public service cars.

7. That jitneys, so called, and all public service motor vehicles (excepting legally defined taxicabs), transporting passengers for pay, be declared common carriers and, in addition to the requirements of the general motor vehicle laws, shall be subject to public regulation as follows:

(a) All drivers of jitneys and public service automobiles shall first obtain an operator's license therefor from the commissioner of motor vehicles, who shall continue to prescribe the requirements of and have full jurisdiction over the qualification of such drivers, with full power to suspend or revoke such license at any time for cause shown.

(b) All public service motor vehicles transporting passengers for hire shall continue to be subject to inspection and approval by and conform to the requirements of the commissioner of motor vehicles, and shall be limited in number of passengers carried at any one time to the number prescribed by said commissioner.

(c) Giving to municipalities original jurisdiction to regulate all public motor vehicles operated within their corporate limits, as to public convenience and necessity for such operation, routes, schedules, rates and amount of service required on any route, together with such other public regulation and traffic requirements as may be deemed proper; provided, however, that any party aggrieved by any rule, order or requirement prescribed by a municipality, pertaining to public convenience and necessity, routes, schedules, rates or amount of service, shall have the right to appeal therefrom within thirty days thereof to the Public Utilities Commission, and the Public Utilities Commission on all matters so coming before it on appeal shall hear the case *de novo* and shall have full and complete jurisdiction therein.

(d) All public service motor vehicles rendering interurban service on through routes from one city or town to another shall be under public regulation within the exclusive jurisdiction of the Public Utilities Commission as to public convenience and necessity, rates, schedules and routes.

Nothing in the act to be construed as giving the municipality jurisdiction over routes, rates, service or schedules of public service automobiles or buses operated by street railway companies.

8. That the Attorney-General, acting for and in behalf of the State of Connecticut, be authorized to take such action as may be deemed necessary to bring about a termination of federal control of the Connecticut Company, and have the capital stock, property and corporate control and management of said company returned to and reinvested in the owner or owners thereof.

Temporary Aid Suggested by Governor

Chief Executive of Connecticut Urges Remission of Bridge and Paving Charges and Regulation of Jitneys

Governor Everett J. Lake of Connecticut in his inaugural message to the General Assembly on Jan. 5 recommended that temporary aid be extended to the electric railways in the State by relieving them in part or in full from the duty of contributing to the cost of maintaining bridges used by their cars and from bearing the burden of street improvements in thoroughfares occupied by their tracks. The Governor is an engineer. He has, perhaps, on this account had opportunities for the study of the railway problem not ordinarily possible to executives coming from other walks of life.

THE Governor said that he was of the opinion that financial aid could not constitutionally be given to the electric railways. Besides recommending temporary relief in regard to the remission of pavement and bridge expenses, he urged that the Public Utilities Commission be authorized to supervise jitney buses instead of having these vehicles regulated by the cities. Legislation to enable the electric railway to operate motor buses also was recommended by him.

RAILWAY SITUATION ACUTE

In that part of his address dealing with the electric railways the Governor said:

The electric railway situation in the State is acute and demands your early attention. The situation is one which concerns not only those of you who come from the centers of population, but it is of vital importance to every section of the State and to the tax-paying public as a whole.

Some of the electric railway systems have been abandoned, others are being continued in operation under the supervision of the state courts, and one is being operated by trustees appointed by the United States court. Few, if any, have paid any dividends to their stockholders in recent years and, indeed, it is a vital question as to whether they can under present economic conditions continue even to exist and operate.

Fares have been increased after investigation by and with the permission of the Public Utilities Commission, but still the receipts have not kept pace with the increased expense of operation, regardless of the costs imposed upon such companies under existing laws for taxes, for contributions to paving, for bridges and for other public improvements.

This condition exists not only in Connecticut but in every other State, and the subject has been extensively investigated by various independent associations, state commissions and federal agencies.

The last Connecticut General Assembly directed the Public Utilities Commission to make a full investigation of the situation in this State and report its conclusions and recommendations to your body. At the earliest moment after you consider them together with the other sources of information I have mentioned, give the subject thorough investigation, and determine what measures are necessary for relief.

GOVERNOR HIS OWN INVESTIGATOR

My own investigation leads me to recommend the following:

1. I am strongly of the opinion that financial aid, whether temporary or otherwise, cannot constitutionally be extended to electric railway companies from the public treasuries, either from state funds or from those of municipalities or communities served by them.

2. I recommend that electric railways be relieved in part or in full, for a limited period, from the duty now imposed by statute of contributing to the cost of street improvements. This should not, however, include the releasing of such companies from the obligations of replacing such portions of the pavement as are taken up in repairing or constructing their own property by the companies themselves.

3. The present contribution required of such companies to the cost of highway bridges over which their tracks pass may fairly be cancelled in whole or in part.

4. Until it has been convincingly shown that the motor bus or jitney as a transportation medium can fully and at all times fill the place of the electric car, running on defined tracks throughout the congested sections of population in the State, and that it can do so with the same measure of safety to its passengers and to other users of the highway, I believe it to be your duty to see that the present electric railway service is rendered possible, and to prevent by all reasonable methods any interruption of such service. This entails the regulation of the public motor bus, its routes of travel, and the inclusion of it among other classes of common carriers with similar duties and responsibilities. Regulation of this sort by separate municipalities, each acting independently and each case involving local questions aside from the main issue, has provoked exasperating delays and precipitated a crisis in many communities, and has, I believe, been satisfactory to no one. This supervision and regulation should be given to the Public Utilities Commission, and a finding from this commission of public convenience and necessity should be a necessary prerequisite for the operation of any public service motor vehicle upon any route of travel.

5. Any additional legislation deemed necessary to enable the electric railway to operate motor bus lines, and particularly as connecting links with or feeders to their regularly maintained lines, should be enacted.

6. Believing as I do, that many of the troubles of the electric railway are due to the abnormal economic conditions of the present time and that more normal conditions will prevail in the not very distant future, I recommend that the various measures of relief be, in so far as possible, of a temporary rather than a permanent nature.

RAILWAY A MONOPOLY

7. Costly experience has taught that the public is better and more economically served in the public utilities under well regulated monopolies than under irresponsible competition; and this, I believe, holds true with our transportation situation.

8. You should bear continually in mind that this investigation and the desired measures of relief have for their prime object, not to further the financial interests of either electric railway owners or jitney proprietors but to promote the public welfare and to assure by fair means ample transportation facilities.

Detroit Case Before Supreme Court

Detroit United Railway and City Present Arguments Before Highest Tribunal to Establish Their Respective Rights

The case of the Detroit (Mich.) United Railway, to stop the construction of municipal lines in Detroit, was scheduled to open on Jan. 3 before the United States Supreme Court in Washington with Charles Evans Hughes and Elliott G. Stevenson representing the Detroit United Railway and Clarence E. Wilcox, Corporation Counsel, and Alfred Lucking, special counsel, appearing for the city.

ACCORDING to a statement by Mr. Stevenson before leaving for Washington, victory for the Detroit United Railway in the pending suit would put an end to the construction of a municipal system under the present Couzens plan. If the suit is won by the city, and the city proceeds under the present plan as approved by the voters last April, it is contended that chaos will result during the time the Detroit United Railway tears up its tracks on streets where franchises have expired, and while new lines are being constructed by the city.

CASE SET FOR JAN. 3

City street railway officials contend that the hearing before the Supreme Court represents the last stand of the Detroit United Railway against the construction of the municipal lines voted last April. An injunction sought in the District Court by the company immediately after the election was denied by Federal Judge Tuttle. When a temporary injunction was sought from the Supreme Court, the court advanced the hearing of the appeal to Jan. 3.

In discussing the bearing of the outcome of the case on the street railway situation in Detroit Mr. Stevenson explained that it may have a very important bearing on the situation, and it may have no bearing but to turn the whole subject and controversy back to the local and state courts for determination.

The attack made by the railway had for its principal object the amendment of the municipal ownership proposition adopted last April, upon the ground that this adoption was brought about by the electors being imposed upon as to what was involved in the proposition submitted.

INCREASED TRANSPORTATION PROPOSED

The proposal, according to Mr. Stevenson, was to increase tranportation facilities for passengers in Detroit, not to destroy the most important part of those existing, and replace them with similar tracks and equipment at greatly increased cost. The methods employed in obtaining the adoption of the proposition, the railway contended, were such that they rendered the proceedings invalid.

This question ordinarily would be held to be a local or state question and not a federal question, but counsel for the railway claimed that in other respects the rights of the company, guaranteed under the federal constitution, were invaded. Moreover, it associated with the claim the alleged invalidity of the submission of the proposition presenting the local or state question referred to. This it had a right to do if there was, in fact, a federal question also involved and this even though in the end the federal question might be decided against the company.

The city has contended from the beginning, Mr. Stevenson stated, that there was no federal constitutional question involved in the suit commenced by the company in the federal court and, although Judge Tuttle held that the company's allegations were sufficient to confer jurisdiction on the federal courts, the city counsel in the Supreme Court still are insisting that there was no jurisdiction in the federal court to pass upon the question presented.

ISSUE COMPLICATED

It will thus readily be seen that if the city's contention as to the lack of jurisdiction of the federal court shall be sustained, the other questions, particularly the question of the alleged invalidity of the municipal ownership proceedings, will not be decided, but will be left for the state courts to decide. If, on the other hand, the company's contention with reference to the jurisdiction of the federal courts shall be sustained, the Supreme Court will proceed to decide the other questions presented and the decision of the court in that event will be of very great importance, Mr. Stevenson states, in determining the relative rights of the company and the city with reference to the cessation or continued operation of the existing street railway.

The first question that will then have to be considered and the question upon which depends the determination as to whether any rights of the company will be involved in carrying out the municipal ownership plans is this: "Has the company now the right to continue to operate its system on the streets when franchises have expired?" The Denver water case and the Kronk ordinance case are cited as involving similar questions.

According to Mr. Stevenson, the Detroit United Railway is not contending that it has any perpetual or other rights except the right conferred with the duty referred to; that duty is to continue to occupy the streets and operate its service until such time as the city has made lawful provision for the transportation needs of the public being met, and it claims that the time has not come when they can require the company to discontinue its service and vacate the street it occupies, no other provision for the public need having been lawfully provided.

Wages Cut in Cleveland

Pay of Track Laborers Reduced Twenty per Cent—Cut for Shopmen Announced

A general reduction of 20 per cent in the wages of track laborers, effective on Jan. 1, has been announced by John J. Stanley, president of the Cleveland (Ohio) Railway. There are now about 200 track laborers in the maintenance of way department who have been getting 50 cents an hour. Hereafter they will receive but 40 cents an hour. Before the war the wage was 26 cents an hour. During the summer the number of employees of the maintenance of way department runs as high as 1,500 men.

A reduction of approximately 15 per cent in the pay of shop department employees of the company has also been announced for Feb. 1. John J. Stanley, president of the company, said:

> This reduction in wages is a forerunner of what we expect to do to trainmen's wages when our agreement with the local of the Amalgamated Association of Street & Electric Railway Employees expires on May 1.

Trainmen in Cleveland now receive 70 cents an hour for the first three months, 73 cents for the next nine months and 75 cents an hour after the first year of service.

The contract with the union can be opened by either party on April 1. Mr. Stanley, it is expected, will serve his formal demand for a reduction in wages of the trainmen about that time.

The maximum rate of fare allowed by the Tayler service-at-cost franchise, namely, 6 cents cash or nine tickets for fifty cents, with a 1-cent charge for transfers, has been in effect in Cleveland ever since the middle of November.

The reduction in wages is due to the fact that receipts under the maximum rate have not come up to expectations. The directors are dubious as to the company's ability to maintain the present service and pay the present wage at the maximum rate of fare.

Three Killed and Fifty Injured in Trail Car Accident

Three persons were killed and more than fifty injured on Dec. 27 in Pittsburgh, Pa., when a trail car of the Pittsburgh Railways broke from the pilot car, dashed four squares down a steep grade and crashed into another car ascending the grade. The accident occurred in Forbes Street, when the coupler broke.

The passengers were thrown into a heap in the center of the car and many were trampled in the mad rush of those uninjured to escape from the car. The passengers in the car following the trailer were thrown to the floor by the impact and many were cut.

Brooklyn Lines Reviewed

Manager of Surface Properties Deplores Attitude of Local Administration—Fare Increases Planned

In a statement to the board of directors sent to the stockholders on Dec. 31 H. Hobart Porter, vice-president and general manager of the Brooklyn City Railroad, reviews the condition of the property as well as the situation of the electric railway industry generally in the United States.

FIVE-CENT FARE CONFISCATORY

He asserts that a fair return on the Brooklyn City lines is impossible at a 5-cent fare and that "under existing conditions the sole hope of the stockholders must be that their property may be preserved until such time as the transportation problems of the city shall be taken up and considered by fair-minded men to the end that the people of the city may have a well-developed transportation system which can continuously provide for their needs."

Mr. Porter states that the electric transportation systems of the city of New York have been confronted not only by the problems which have seriously embarrassed the operations of electric railway companies all over the United States but also by special difficulties due to the attitude of the municipal administration which, he adds, has steadfastly refused to co-operate to solve these problems. He contrasts the position of the New York municipal authorities with that of other cities whose co-operative attitude, he declares, has resulted in increased fares being granted in almost every important city in the country.

MANY QUERIES FROM STOCKHOLDERS

Supplementing his statement to the directors Mr. Porter said that it was made necessary by the many inquiries which the officials of the company were receiving from the stockholders, who were unable to understand why this property, always considered one of the most conservatively capitalized public utilities in the United States, with a record of paying dividends for many years, should, since the termination of the lease with the Brooklyn Heights Railroad, have failed to make any distribution to the stockholders.

It is being constantly pointed out to the management of the Brooklyn City Railroad by these stockholders, Mr. Porter continued, that the stock had been purchased as a safe and conservative investment for women, trustees and estates and that the failure to pay dividends was working great hardships. Mr. Porter pointed out that out of approximately 1,500 stockholders one-half were women and that in addition much stock was held by trustees, administrators, guardians, life insurance companies, charitable institutions and colleges. As a matter of fact, Mr. Porter said, approximately two-thirds of the stock of the company is so held, the remaining third being divided between individuals and other corporations.

Mr. Porter says that the fiscal year of public utilities companies in New York State ends on June 30, and that it will not be possible until after June 30, 1921, to make a report which will show the results of independent operation of the Brooklyn City Railroad for a full year.

The company has recently announced its intention to collect a second 5-cent fare on other lines than the Flatbush Avenue branch, but it is explained that the Mayor in the public press has given instructions for new and further litigation, the only apparent possible object of which, in view of the decision referred to by Mr. Porter, is to cause further delay, embarrassment and expense to the company.

BROOKLYN CITY RAILROAD OPERATED SEPARATELY

The receivership of the Brooklyn Heights Railroad resulted in breaches in certain covenants of the lease under which the Brooklyn City Railroad was operated and in consequence Judge Mayer, in the United States District Court, ordered the receiver of the Brooklyn Heights Railroad to return the Brooklyn City Railroad's property to it on Oct. 19, 1919, since which time the Brooklyn City Railroad has been operated under the direction of its own officials.

Mr. Milner Represents City on New Traction Board

William L. Milner, author of the cost-of-service ordinance at Toledo, Ohio, has been appointed by the board of sinking fund commissioners to serve on the board of directors of the Community Traction Company, which will begin to function as soon as the new ordinance is legally put into operation.

The board is composed of five members, four of whom will represent the Toledo Railways & Light Company, to which concern the bonds of the Community Traction Company are to be issued.

Mr. Milner will represent the city, which will gradually acquire an equity in the property of the Community Traction Company, through the issuance of paid-up common stock to it at the retirement of any of the bonds through the sinking fund which is made up of a certain portion of the income from railway operation.

It is understood that officials of the company would welcome the addition of several such members of the board to give more public interest to the operation of the lines and to create a larger degree of liaison between the company and the people of the community. Action to increase the membership may be proposed at a later date.

Several more applications for appointment to the office of street railway commissioner have been received by the street railway board of control. It is understood that the choice will be made in the next two weeks.

Suspension of Service Explained

The British Columbia Electric Railway, Vancouver, B. C., experienced a shutdown of four to ten minutes on its light and power system and twenty minutes on its railway system on Dec. 20. The shutdown extended over the entire Vancouver district on both the British Columbia Electric Railway lines and Western Power Company lines, tied in together. Small boys throwing stones broke some insulators which caused the trouble. The suspension occurred at 2 o'clock in the afternoon while the streets were filled with Christmas shoppers. The short circuiting of high tension lines caused a surge on to the other circuits and resulted in the interruption.

In order to explain the situation to the public the railway took space in the newspapers to offer a reward of $100 for the arrest and conviction of the persons causing the damage. One of the advertisements follows:

> WHY THE POWER WENT OFF
>
> The British Columbia Electric Railway regrets the shutdown of electric power on its and the Western Power Company's whole system yesterday afternoon.
>
> The cause was the mischievous breaking of ten insulators on high-tension poles in North Vancouver by boys, according to the evidence available.
>
> As a result, light and power circuits were out four or more minutes, depending upon the district, and the railway lines up to twenty minutes.
>
> Such willful destruction of electrical apparatus, on which the life of the community depends, is punishable under the criminal code, because the cessation of electric current for a moment is liable to cause death (in hospitals), injury to person and loss and destruction of property.
>
> We take this opportunity to acquaint the public of the circumstances surrounding this case, in order that they may co-operate in safeguarding the public service and preventing any recurrence of such criminal interference with the service on which the community relies.

Traction Board Appointed at Portsmouth

A "traction board" for the information, advice and guidance of the city manager in his handling of matters affecting the local railway is the latest move on the part of the city government of Portsmouth, Va.

When Gen. J. P. Jervey, U. S. A., went to Portsmouth as city manager a few months ago he was favorably impressed with the operation of the city utilities commission of Norfolk across the Elizabeth River, and the "traction board" just named is the result of his observation of the operations of the commission in Norfolk. The board appointed by the city manager is composed of J. Davis Reed, director of public safety, as chairman; W. L. Davis, superintendent of the water department, and John C. Neimeyer, commissioner of the revenue of the city of Portsmouth, with M. E. Haugh of the office of the city engineer as secretary.

It will be the duty of the board to study the traction situation in Portsmouth, employ a competent engineer if deemed expedient, to make recommendations for the betterment of the service, to receive and consider suggestions from the public, to hear complaints concerning service rendered and to report to the city manager its findings, conclusions and recommendation for the guidance of the city manager in his associations with the members of the City Council.

The personnel of this "traction board" is of an unusually high type. The appointment of the members by the city manager is heartily approved by the citizens. The board began to function on Jan. 1.

News Notes

To Supplant Weekly Bulletins.—*Byllesby Monthly News* is the name of a new publication issued by H. M. Byllesby & Company, Chicago, Ill. This monthly pamphlet will contain all the news of the preceding month which appeared in the weekly bulletins. It will be confined to four pages. This publication is issued primarily for the information of all holders of securities of the companies controlled by the Byllesby interests.

Offer Made to City.—The Monterey & Pacific Grove Street Railway has offered its properties to the city of Monterey, Cal. A written proposal in the form of an option gives the city the privilege of purchasing the road provided the purchaser shall assume the outstanding indebtedness of the company and compensate the stockholders for their holdings.

Motor Buses for Suburban Traffic.—The City Electric Company, which operates the railway system in Albuquerque, N. M., has announced that motor bus service will be put into effect during this month in order to relieve suburban traffic. The buses will be operated strictly on a fixed schedule and will route just the same as the street cars.

Lease to City Proposed.—A contract has been sent to the city authorities at Elwood, Ind., by the Union Traction Company, offering to rent the Ninth Street and Twenty-eight Street tracks in Elwood and to provide a car to enable the city to operate to the tin plate and glass factories. The city has been without local railway service for the past year.

Civic Organizations Urge Purchase of Railway.—Fifteen civic organizations in San Francisco, Cal., have written the Mayor within a week, according to the San Francisco *Municipal Record* of Dec. 23, urging action on amendment 30, which was carried on the November ballot. This amendment, described in the ELECTRIC RAILWAY JOURNAL of Nov. 6, page 983, is an enabling act which provides a method whereby the city could purchase the system of the United Railroads after that action is approved by popular vote on the plans advanced by the city.

Another Motor Bus Failure.—The Lambeth Motor Bus Company, organized after the failure of the London & Lake Erie Radial Railway to provide service between Lambeth and London, Ont., has gone into voluntary liquidation. The motor bus used was a thirty-two-passenger body on a 3½-ton chassis. In winter, however, it was frequently necessary to suspend the bus service and carry passengers in a horse-drawn sleigh. Fares were raised to a point much higher than the old radial tariffs and a considerable portion of Lambeth's population removed to London. The bus service was entirely too unreliable for them.

Improvement in Quality of Applicants.—J. B. Hayner, superintendent of employment of the Los Angeles (Cal.) Railway, reports that for several weeks past there has been noticed a very great daily improvement in the class of applicants. George Baker Anderson, manager of service of the company, writing in *Two Bells*, said: "The employment offices, once filled daily by groups of men, many of whom were most apparently not fitted for service on the street cars, are now occupied by men numbering among them some of the finest specimens of humanity that one would care to see—men physically strong, alert, ambitious, and frequently well educated—many of them gentlemen in every sense of the word."

A Plea for Public Utilities.—H. M. Addinsell, a member of the Public Utilities Securities Committee of the Investment Bankers' Association, has recently contributed an article to the American Review of Reviews, entitled "Why the Utilities Are the People's Business." In this account he tells of the overwhelming duties and responsibilities of the utility agency and describes the attitude of the average person toward public service in general. Mr. Addinsell spoke along this same line in New London on Sept. 15, when he addressed the annual convention of the Association of Edison Illuminating Company. Reference was made to this speech in the ELECTRIC RAILWAY JOURNAL for Dec. 18.

Mutual Aid Pays Christmas Dividend.—Members of the Traction & Power Mutual Aid Association, composed of employees of the Utah Light & Traction Company, the Utah Power & Light Company and the Phoenix Utility Company, Salt Lake City, Utah, recently held their annual meeting and elected the officers for the coming year. During the year the association paid death claims amounting to $2,300, and sickness, accident and refund claims to members totaling $3,520. A surplus amounting to $4,085 was divided among the 615 members of the association and was pro rated according to length of membership. The employees who were members in good standing of the mutual aid association throughout the past year each received a Christmas dividend of $7.20.

Programs of Meetings

Iowa Engineering Society

The annual meeting of the Iowa Engineering Society will be held at the Chamberlain Hotel in Des Moines on Jan. 18-20. There will be an exhibit of apparatus in connection with the meeting.

Conference on Highway Traffic Regulation

A national conference on highway traffic regulation will be held at the Hotel Washington, Washington, D. C., on Monday, Jan. 10, at 10 a.m. The meeting is the outcome of the discussion on the proposed national traffic law considered at the meeting of the National Traffic Officers Association at San Francisco last summer.

In addition to the fifteen associations which met recently at Cleveland and issued the call for the Washington conference, representatives have been appointed or are being appointed by such important interests as the American Association of State Highway Officials, Council of National Defense, Federal Highway Council, National Automobile Underwriters' Conference, National Conference of Commissioners on Uniform State Laws, National Highway Traffic Association, Society of Automotive Engineers, and U. S. Chamber of Commerce (attending unofficially).

S. J. Williams, secretary and chief engineer of the National Safety Council, Chicago, is assistant secretary of the National Conference on Highway Traffic Regulations.

Indiana Public Utility Association

Philip H. Gadsden, president of the American Electric Railway Association, will be one of the speakers at the annual meeting of the Indiana Public Utility Association in Indianapolis on Jan. 13. The session will be the first ever held in all branches of the industry. Plans for it are being made by a committee headed by Harry Reid, president of the Interstate Public Service Company.

Charles L. Henry, president of the Indianapolis & Cincinnati Traction Company, is president of the Indiana Public Utility Association. He will preside at all the sessions, including luncheon and dinner meetings in the Riley room of the Claypool, and a general session in the Assembly Hall. In announcing the date for the meeting Mr. Henry said:

> We are adopting a new idea by planning to have our sessions semi-public. We cannot, of course, hold public meetings within the time and space available, but we are asking all utility company operators who attend to bring with them representative men from their respective communities. We hope to have the list of guests include leaders in public thought from all parts of the State, such as newspaper editors, city and county officials, bankers and business men generally. The public utility industry is the people's business. It is part of our task, therefore, to accommodate ourselves to the public wish. On the other hand, we feel that the public should know our problems and understand our difficulties.

Financial and Corporate

America's Biggest Bus Company

Income from Operation of Fifth Avenue Coach Company, New York, Decreased $90,581

The annual report of the Fifth Avenue Coach Company, New York, America's biggest and oldest motor-bus system, shows that the company is still getting on with its 10-cent flat fare despite large increases paid for wages and gasoline. The operating expenses per bus-mile, exclusive of taxes, rose from 29.03 cents in the year ended June 30, 1919, to 35.54 cents in the following year, and inclusive of taxes the corresponding costs were 35.05 cents and 40.2 cents. This was offset partly by improvements in short-routing and other schedule features which raised the operating income from 46.28 cents to 49.50 cents—an extraordinary record for the last decade of this company. However, the difference between revenue and total operating expenses per bus-mile declined from 11.23 cents to 9.3 cents.

The following comparison is drawn from the preliminary synopsis issued by the Public Service Commission of the First District of New York.

(a) The rule of the company concerning depreciation of equipment, as filed with the commission, provides for a charge to expense from Jan. 1, 1919, "equal to 9.17 cents per bus-mile, which is estimated to be sufficient and necessary to cover such wear and tear and obsolescence and inadequacy as may occur on all equipment." The basis includes the non-revenue miles (39,698). The amount reserved after deducting the cost of repairs comprises $186,304 for depreciation of equipment, $16,686 for buildings and $10,019 for shop tools and machinery.

(b) Reported as "depreciation of tires" is based on the "bus-tire mileage" at the guaranteed tire cost per mile, credit being made for tires which exceed the guaranteed mileage and for scrap.

(c) For payment of claims the company charges expenses (and credits reserve) at the rate of 1 cent per bus-mile. Payments in current year exceeded this allowance by $40,234, which was drawn from the reserve.

(d) Includes balance on unamortized cost of equipment retired during year, obsolete bus parts scrapped, loss on sale of securities, depreciation of vehicle equipment and buildings, etc., and other debits, and credits, such as adjustment of Federal taxes, bad debts collected, etc.

The company employed as of June, 1920, 400 conductors, 382 drivers and 412 "others," a total of 1,194. Total salaries and wages were $2,049,682, an increase of $528,702 over the preceding years. During the year four persons were killed and forty-seven injured.

OPERATIVE STATISTICS OF FIFTH AVENUE COACH COMPANY

	1920	1919
Number of revenue buses	271	279
Round trips made during the year	569,132	513,416
Revenue bus-hours (including 6,084 special)	1,105,935	1,011,939
Revenue bus-miles (active 8,592,277; idle, 166,216; private hire, 37,702)	8,796,195	8,087,127
Number passengers carried at 10 cents	42,552,709	36,488,447

	1920		1919	
	Per Bus-Mile (Cents)	Total	Per Bus-Mile (Cents)	Total
Receipt from fares	48.37	$4,255,271	45.12	$3,648,845
Rent from livery service	0.33	28,710	0.66	53,659
Advertising and miscellaneous	0.80	69,970	0.50	40,194
Total revenue from operation	49.50	$4,353,950	46.28	$3,742,697
Maintenance (*a*):				
Superintendence, ($75,376; shop expenses, $27,006)	1.17	$102,383	0.77	$62.421
Repairs (bus bodies and chassis, $383,276)	4.61	406,239	3.71	299,626
Tires (*b*)	0.98	86,065	0.95	76,596
Depreciation (reserved)	2.42	213,008	1.02	82,503
Total maintenance	9.18	$807,694	6.45	$521,146
Conducting transportation	23.23	$2,043,894	19.68	$1,591,640
Accidents and damages (*c*)	1.35	118,656	1.28	103,682
Traffic—Advertising	0.16	13,908	0.11	8,767
General and miscellaneous	1.62	142,340	1.62	122,360
Total operating expenses	35.54	$3,126,493	29.03	$2,347,594
Taxes	4.66	409,726	6.02	486,790
Total revenue deductions	40.20	$3,536,218	35.05	$2,834,384
Income from operations	9.30	$817,732	11.23	$908,313
Non-operating income (rent, $26,500, interest $23,948)		$50,448		$41,408
Gross income applicable to corporate and lapsed properties		$868,180		$949,721
Income deductions (interest, $8,917 and rent)		85,052		105,763
Net income for year		$783,128		$843,959
Surplus adjustments — net deduction (*d*)		144,322		228,061
Net increase in corporate surplus		$638,806		$615,898

"Save with a Smile"

"Save with a Smile" is the name of a pamphlet issued by H. M. Byllesby & Company, Chicago, Ill., as a further effort on the part of the company to promote thrift and economy. In this booklet of fifteen pages are contained quotations of Abraham Lincoln, Benjamin Franklin, Thomas Jefferson and others on the principles of saving and accumulating money. An interesting account on the subject of investment is given accompanied by a chart which shows the minimum amount of money one can possess at the end of one to twenty-five years if a certain amount of income is saved and invested to yield 7 per cent. The appeal is to "Save With a Smile."

Receiver for Maumee Line

Appointment Made Following Investigation of Committee Representing Bondholders

Following an investigation by the bondholders' committee of the affairs of the Maumee Valley Railways & Light Company, Raleigh D. Mills, assistant cashier of the Home Savings Bank, Toledo, was made receiver for that electric railway by Judge Brough in Common Pleas Court at Toledo, Ohio, during the week ended Jan. 1.

VERDICT OF $1,675,000 SOUGHT

A verdict of $1,675,000 is also sought against the Toledo Railways & Light Company and other stockholders of the railroad. It is charged that there are unpaid stock subscriptions and that stockholders have double liability in some cases.

The suit was filed in the name of Ella Van Deusen, a creditor of the company. The case goes back into the history connected with the consolidation of the old Toledo & Maumee Railway and the Toledo, Waterville & Southern Railway when the two lines, capitalized at less than $325,000, were merged into a company with a capitalization of $1,000,000.

Attorneys Barton Smith and Rufus H. Baker, who are fighting the Toledo Railways & Light Company, in the present case, were attorney and president respectively of the company which brought about the consolidation in 1902. They repudiate the legal steps taken by their own board at that time.

The claim of the plaintiff in the action is based upon the first mortgage bonds of the old Toledo & Maumee Railway, of which there are $300,000 outstanding. They became due and payable on March 1, 1920, but were not met at that time.

A bondholders' committee was formed with Marion M. Miller, president of the Home Savings Bank, Toledo, as chairman. C. L. Reynolds, of the First National Bank; J. D. Biggers, of the Owens Bottle Company; Frederick W. Stevens, Ann Arbor, Mich.; and George B. Storer, deceased, late of the Standard Steel Tube Company, were appointed members of the committee.

ROLLING STOCK RENTED

The line owns only three cars. The rest are rented from the Toledo Railways & Light Company at $5 each a day. Power is secured from the Toledo Railways & Light Company, and the Toledo, Bowling Green & Southern Traction Company.

Although higher rates and fares were put into effect nearly a year ago the Toledo Railways & Light Company has lost money on the operation of the road for that time.

The road connects Toledo, Maumee and Perrysburg. Included in the system are 23.21 miles of track. Frank R. Coates, president of the Toledo Railways & Light Company, is president of the Maumee Valley Railways & Light Company.

$207,617,530 in Maturities

Sixty-eight per Cent of Grand Total of $305,110,350 of Utility Maturities in 1921 Fall to Electric Railways

Public utility securities falling due for payment during 1921 aggregate $305,110,350 against $196,296,800 in 1920 and $261,887,600 in 1919, according to the *Wall Street Journal.* This unusually large amount is due in a great measure to the fact that many issues maturing in 1920 were extended because of the tight money market and unfavorable conditions for financing public utility corporations. Of the grand total for all the utilities the amount maturing in the electric railway field is $207,617,530.

THE heaviest maturities in the railway field are in New York City. Among these issues are Interborough Rapid Transit three-year 7 per cent notes amounting to $39,199,000, due Sept. 1, 1921, Brooklyn Rapid Transit three-year 7 per cent notes for $57,230,000, due July 1, and Brooklyn Rapid Transit Company $18,000,000 two-year 6 per cent receivers' certificates, due Aug. 1, 1921.

Below is given in detail as compiled by Dow, Jones & Company, the various electric railway issues of more than $200,000 maturing in 1921 in the order of their date:

January		
East St. L & Suburban conv.	7	$2,116,000
Little Rock Ry. & E. 1-yr. notes	7	1,000,000
Mid. West Util. ser. D notes	6	1,000,000
Pueblo Traction & Ltg. 1st	5	990,000
Rockland, Thom. & Camd. St. Ry	4	800,000
Peoples Railroad 1st	5	750,000
Dallas Electric 5-yr. notes	6	750,000
Pensacola Electric 2-yr. notes	7	500,000
Oklahoma, Railway sec. notes	7	450,000
Decatur Trac. & Elec 1st	5	212,000
Bristol County St. Ry. 1st	5	200,000
Winnipeg Elec. Ry. 2-yr. notes	6	750,000
Total		$9,518,000
February		
St. Louis & Suburban Ry. cons.	5	2,000,000
Un. Rys. & Elec. of Balt., notes	5	1,222,000
United Ry. Investm't 4-yr. notes	5	1,000,000
Wis.-Minn. Lt. & P. 1-yr. notes	7	600,000
Fitchburg & L. St. Ry. cons.	4½	300,000
Connecticut Co. prov. debents.	5	250,000
Total		$5,372,000
March		
Rhode Island Co. 5-yr. notes	5	1,662,000
Amer. Gas. & Elec. 3-yr. notes	6	1,390,000
Public Service of Nor., Ill., deb.	6	1,000,000
Oklahoma Ry. Series F notes	8	375,000
Com'nw'th Pub. Ser. 2-yr. notes	6	300,000
Charles City West'n Ry. notes	7	240,000
Total		$4,697,000
April		
Wilkes-Barre & Wyo. V. Trac. 1st.	5	$1,500,000
Birmingham R. L. & P. ext. notes	6	1,200,000
Interurban Railway 1st	5	1,160,000
Manchester Trac., Lt. & P., 1st	5	914,000
Everett Railway & Electric 1st	5	825,000
Portland Light & Power 1st	4½	500,000
Rapid Tr. St. Ry., Newark 1st	5	500,000
Total		$6,599,000
May		
Evansville Electric Ry. 1st	4	$1,200,000
Tol., Bowl. Green & So. Trac. 1st.	5	1,003,500
Detroit & N'western Ry. 1st	4½	855,000
Columbus, Del. & Marion R.R. 1st	5	289,000
West End Street Ry. 1st	5	225,000
Kansas City Rys. 3-yr. A notes	7	7,750,000
Monongahela Val. Trac. 1-yr. notes	7	2,000,000
Total		$13,322,500
June		
Puget Sd. T., Lt. & Pr. 3-yr notes	7	$14,601,000
Ohio Cities Gas ser. cv. notes	7	2,000,000
Chattanooga Ry. & Lt. 1-yr. notes	6	750,000
Chi., No. Shore & Milw. R.R. nts.	7	260,000
Total		$17,611,000
July		
Brooklyn Rap. Transit 3-yr. notes	7	$57,230,000
Consolidated Ry. & Power 1st	5	1,401,000
Hartford & Springfield St. Ry. 1st	5	600,000
Dover, Somer. & Roch. St. Ry	5	300,000
Virginia Rwy. & Power notes	6	200,000
Total		$59,731,000
August		
B. R. T. 2-yr. receiver's ctfs.	6	$18,000,000
Am. Power & Lt. 10-yr. notes	6	2,200,000
Lindell Railway extended 1st	4½	1,500,000
Detroit & Flint Railway cons.	5	1,400,000
Salt Lake & Utah R.R. notes	7	562,500
Iowa Ry. & Light 2-yr. notes	6	731,500
Total		$24,394,000
September		
Interborough R. T. 3-yr. notes	7	$39,199,000
Elgin, Aurora & Sou. Trac. cons.	5	1,546,000
Aurora, Elgin & C. 3-yr. notes	7½	1,219,000
Mid. West Util. Series E notes	6	800,000
Standard Gas & E. 3-yr. notes	7	710,000
South Car. Lt., P. & Rys. notes	7	650,000
Total		$44,124,000
October		
Ottumwa Traction & Light 1st	5	262,500
Hagerstown & Fr. Ry. 1-yr. notes	8	1,050,000
Total		$1,312,500
November		
Western Ohio Railway 1st	5	$2,500,000
Columbus, B. L. & N. Traction	5	1,243,000
Trumbull Public Service notes	7	1,200,000
Seattle Railway 1st	5	335,000
Standard Gas & E. 2-yr. notes	7	4,349,000
Total		$9,627,000
December		
Toledo Tr., L. & P. 2-yr. notes	7	$10,000,000
Portland Ry., L. & P. ser. notes	7	500,000
Wheeling Traction p. m. notes	7	309,530
Mass. N. E. St. Ry. 1-yr. notes	8	230,000
Total		$11,039,530

Public utility bonds and notes maturing in:

January	$9,518,000
February	5,372,000
March	4,967,000
April	6,599,000
May	13,322,500
June	17,611,000
July	59,731,000
August	24,394,000
September	44,124,000
October	1,312,500
November	9,627,000
December	11,039,530
Total electric railway maturities	$207,617,530
Grand total public utility issues maturing in 1921	$305,110,350

Receivers Appointed for the Toledo & Western Railroad

Harry A. Dunn, assistant trust officer of the Ohio Savings Bank & Trust Company, Toledo, and J. Franklin Johnson have been named receivers of the Toledo & Western Railroad, Toledo, Ohio, by Federal Judge John M. Killits, on complaint of Henry L. Doherty & Company.

The bill of complaint charged that the interurban owed $324,902 to the Doherty interests. A part of this amount was a loan from the Toledo Railways & Light Company, and the remainder from Henry L. Doherty & Company, direct. It was also alleged that many suits were pending in court against the company.

The main line of the company runs west from Toledo to Pioneer and with a branch to Adrian, Mich. The principal business of the company is handling freight. Many manufacturing plants would be deprived of facilities if service were stopped and the line abandoned.

There are $2,500,000 of bonds outstanding against the property. Interest on these bonds is in default.

During the six months' period the receivers are instructed to keep the line in operation, marshal the liens, and test the condition of the road. After that period the property may be turned over to the bondholders, the principal creditors, or junked.

J. Franklin Johnson, one of the receivers, has been general manager of the road for the last eight months.

St. Louis Valuation Between $50,000,000 and $60,000,000

Word reached St. Louis, Mo., on Jan. 4 that the valuation of all the physical properties of the United Railways, St. Louis, including subsidiary and county lines, has been fixed by the Missouri Public Service Commission's experts at a figure between $50,000,000 and $60,000,000.

The valuation figures were arrived at after nearly two years' work by engineers of the commission, going over all the lines in St. Louis and verifying the findings from the company's books. The results are now being tabulated, but will probably not be ready to give out in detail for several weeks.

The fixing of the valuation at between $50,000,000 and $60,000,000 ends all chance of reduction of fare in St. Louis. The present 7-cent fare is based on an arbitrary valuation of $50,000,000 fixed by the commission several months ago. The valuation arrived at by the commission is based on the actual cost of property and not on its present or replacement value.

Purchase Deal Approved by Toronto Ratepayers

By a vote of 28,609 to 1,864, the ratepayers of Toronto, Ont., decided in favor of the purchase by the Hydro Commission of the Toronto and Niagara power and radial railway interests controlled by Sir William MacKenzie. Details of this purchase, known locally as the "$32,000,000 cleanup deal," were published in the ELECTRIC RAILWAY JOURNAL for Dec. 11, page 1209.

The necessary agreements are now being prepared and it is hoped to have them ready for execution upon the return of Sir Adam Beck from England, on Jan. 21. Application will then be made to the Ontario Legislature for the necessary legislation validating the various agreements. The negotiations were in progress for a period of more than two years.

On Jan. 1 the ratepayers of Guelph, Ont., by a majority of 680 voted in favor of turning over to the Hydro-Electric Power Commission the operation and management of the municipal electric railway system. The commission will take possession on April 1 next.

Assessed Valuations Reduced Slightly

The assessed valuations of electric railways in the State of Utah, for the year 1920, have been announced. Of the intercounty electric railways the Utah Light & Traction Company has the largest assessed valuation per mile, exceeding in this respect some of the big steam lines. The board of equalization values it at $49,093 per mile, a reduction from $49,445 a year ago. The total valuation of the company's system is $4,570,590, compared with $4,619,210 a year ago.

Of the interurbans, the Bamberger Electric has by far the highest valuation per mile, $42,492, compared with $40,124 a year ago. The total figures are $1,567,554, compared with $1,476,185 a year ago. The Salt Lake & Utah is valued at $30,349 a mile for its main line, and $24,339 a mile for its branch, the figures comparing with $29,973 and $23,654 a year ago. The total assessed valuation is $2,225,470 this year and $2,194,425. The Utah-Idaho Central is valued at $23,841 a mile and pays taxes on $2,560,070, the figures comparing with $21,179 a mile in 1919, and a total valuation of $2,863,312.

Cincinnati Traction Would Issue $3,750,000 of Notes

Approval of an issue of $3,750,000 of 7 per cent three-year collateral trust gold bonds is sought in a communication from the officers of the Cincinnati (Ohio) Traction Company to W. C. Culkins, Director of Street Railroads.

Approval of Mr. Culkins is required under the terms of the amended franchise under which the company is operating. The approval of the State Public Utilities Commission also must be obtained before the securities can be marketed.

The letter explains that of the amount sought $2,250,000 is to be issued as of Jan. 1, 1920, and is to replace temporary notes issued as of that date. The remaining $992,000 is intended for improvements to be undertaken next year. These will include the extension of the Warsaw Avenue line to Covedale, remodeling carhouses, relaying of track on streets to be improved by the city, and other betterments to the lines of the Cincinnati Traction Company.

Traction Notes Fetch Ten Cents on the Dollar

Five per cent five-year collateral trust notes of the Rhode Island Company, Providence, R. I., to the face value of $72,000, were sold on Dec. 29 by G. L. & H. J. Gross at a public auction for $7,200, or 10 cents on the dollar. The purchaser was Benjamin R. Jackson, for the Providence Banking Company.

The notes were part of an issue of $1,662,000 issued by the Rhode Island Company, March 1, 1916, against 20,783 shares of United Traction & Electric Company stock deposited under a Trust Company. The interest on these notes has been defaulted since March 1, 1919.

After the Rhode Island Company went into the hands of receivers the collateral for the notes was deposited with the United Traction stockholders' committee by permission of the Superior Court, to be held subject to the developments of a reorganization. If the traction properties are taken over by the United Electric Railways under the terms of the existing reorganization agreement, each $1,000 note will be secured by approximately 10 1-3 shares of stock of the United Electric Railway.

3,500,000 Fewer Passengers in Philadelphia at 7-Cent Fare

The total number of riders on Philadelphia (Pa.) Rapid Transit Company cars last month, with the 7-cent fare in effect, was 3,500,000 less than the number in December, 1919, at the 5-cent rate, according to W. C. Dunbar, vice-president of the company.

Mr. Dunbar also says that the sale of tickets at four for a quarter made the company's revenue last month exceed that of December, 1919, by $657,589.

Seven per Cent Increase in Operating Income of Tubes

The Hudson & Manhattan Railroad, under federal operation, had a remarkable increase in net income. In 1918 the net income was in fact a deficit of more than $40,000, while in 1919 the same item was $122,300, an increase over 1918 of 400 per cent. The total railway revenue for 1919 increased $1,052,296 or 20.7 per cent over 1918.

At the same time, the total operating expenses increased $868,545 or 33.6 per cent. Net operating revenue for 1919 was $2,680,628, an increase of $183,751 or 7.4 per cent. The remaining items, such as taxes, non-operating income and deductions, were very nearly the same during the two years so that the increase in net income was $163,122, making a net income for 1919 of $122,300, since 1918 was a deficit.

With only 20 miles of single track, the number of revenue car miles amounted to more than 9,275,000. The number of revenue passengers carried was 94,102,461. The operating ratio changed from 50.8 in 1918 to 56.3 in 1919, an increase of 5.5 per cent in one year.

The company operates under the Hudson River from both uptown and downtown New York to New Jersey.

INCOME STATEMENT— HUDSON & MANHATTAN RAILROAD

Year Ended Dec. 31:	1919	1918	Percentage Change
Revenue from transportation	$5,747,298	$4,715,120	21.9
Revenue from other railway operations	383,420	363,302	5.5
Total railway revenue	$6,130,718	$5,078,422	20.7
Maintenance of way and structure	518,821	392,986	32.0
Maintenance of equipment	433,851	266,574	62.8
Power	818,750	729,075	12.3
Transportation	1,468,173	995,490	47.5
Traffic	....	715	....
General miscellaneous	210,495	196,705	7.0
Total railway operating expenses	$3,450,090	$2,581,545	33.6
Net operating revenue	$2,680,628	$2,496,877	7.4
Taxes assignable to railway operations	369,278	342,767	7.7
Operating income	$2,311,350	$2,154,110	7.3
Net income from Hudson Terminal building	781,738	795,179	— 1.7
Net income from other real estate	30,487	20,840	46.3
Total operating income	$3,123,575	$2,970,129	5.2
Non-operating income	101,252	96,861	4.5
Gross income	$3,224,827	$3,066,990	5.1
Deductions from gross income:			
Interest on car purchase agreements	$9,033	$17,467	—48.3
Interest on real estate mortgages	43,215	43,795	— 1.3
Rental tracks, yards and terminals	62,050	79,480	—21.9
Amortization of debt discount and expense	39,795	39,795	....
Miscellaneous deductions	139,899	98,740	41.7
Bond interest on N. Y. and J. 5's, first mortgage 4½'s, and first lien and refunding 5's	2,168,535	2,168,535	....
Appropriation to reserve for contingencies	640,000	660,000	3.0
Total deductions from gross income	$3,102,527	$3,107,812	0.2
Net income transferred to profit and loss	$122,300	*$40,822	400.0

* Deficit

STATISTICAL INFORMATION—HUDSON & MANHATTAN RAILROAD

Year Ended Dec. 31:	1919	1918	Percentage Change
Miles of road	8.5	8.5	....
Miles of single track	20.028	18.757	6.8
Number of revenue car-miles operated	9,275,286	8,510,430	9.0
Number of passengers carried	94,102,461	79,964,372	17.7
Statistics per car-mile:			
Passenger revenue (cents)	62.0	55.4	11.8
Gross railroad operating revenue (cents)	66.1	59.7	10.8
Operating expenses (cents)	37.2	30.3	22.6
Net operating revenue (cents)	28.9	29.3	— 1.5
Number of passengers	10.15	9.4	8.0
Car-miles per revenue passenger	0.098	0.106	— 7.5
Statistics per mile of road:			
Passenger revenue	$676,153	$554,720	21.9
Operating expenses	$405,893	$303,711	33.6
Net railroad operating revenue	$315,368	$293,750	7.4
Number of passengers	11,070,877	9,407,573	17.7
Passenger revenue per passenger (cents)	6.1	5.9	4.1
Ratio of operating expenses to total operating revenues, per cent	56.27	50.83	5.44
Ratio of operating expenses and taxes to total operating revenues, per cent	62.30	57.58	4.72

Municipal Ownership Voted Down

On Jan. 3 the property owners of Ottawa, Ont., voted on a by-law to purchase the Ottawa Electric Railway at the expiration of its franchise in August, 1923. The proposition was defeated by a vote of nearly two to one. The company has had a proposal of service-at-cost before the city for the past year, but because of the opinion held by the Councillors that the people desired municipal ownership it has not yet been seriously considered. Now that the wishes of the citizens as to municipal ownership have been definitely expressed it is probable that a new contract based on a flexible fare may result.

Financial News Notes

Increase for Purchase Purposes Authorized.—The Chicago & Joliet Electric Railway, Joliet, Ill., has been authorized to issue $1,350,000 of preferred stock and $5,000,000 of bonds by the Illinois Public Utility Commission. The company has also been authorized to purchase the Chicago & Desplaines Valley Electric Company.

Syracuse Suburban Suspends.—The Syracuse & Suburban Electric Railroad suspended operations on Jan. 1. The road runs from Syracuse, to Fayetteville and Manlius. It has been operating at a loss for some time. Passengers were taken care of by means of a temporary motor bus service and with the help of the New York Central.

$983,000 Loss by Pacific Electric.—The Pacific Electric Railway, Los Angeles, Cal., has announced that its losses for the year ended Dec. 31, 1920, will be approximately $983,000. The company states that the increase in its freight and passenger rates as recently granted have not been effective long enough to show definite gains, but that it is anticipated that with these increased rates operative during the year 1921 the lines will show some profits during this year.

Thirty Per Cent Reduction in Force at Lowell.—At a brief meeting of the Home Rule committee in Lowell, Mass., recently, Manager Thomas Lees of the local division of the Eastern Massachusetts Street Railway stated that about 30 per cent of the operators of cars in the city at the present time were laid off because of the general industrial depression. He furthermore said that the revenue of the district for the month of December would be under what was taken in in November, and that November was under October.

A Conspectus of Indexes.—Albert S. Richey, electric railway engineer, Worcester, Mass., has published on a card of pocket size twelve of the standard index numbers, such as Bradstreet (wholesale commodities) Dun, U. S. Bureau of Labor Statistics (retail food), street railway wages, copper, steel rails, U. S. bank clearances, etc. The figures are grouped in five columns showing respectively 1913 average, peak for the current year, year ago, month ago, and current. An explanation on the back of the card tells the way in which these figures are compiled. It is Professor Richey's expectation to publish these figures each month.

Indiana Interurban Leased.—The Gary & Valparaiso Railway, owning and operating 12 miles of interurban railway between Valparaiso and Chesterton in Porter County, Ind., has recently leased for twenty years the interurban railway of the Gary Connecting Railroad extending from Woodville Junction in Porter County west 16 miles to Broadway in Gary, Ind. At Woodville Junction the leased railway connects with the Gary & Valparaiso Railway, and at Broadway in Gary with the Gary Street Railway. Under the lease, the Gary & Valparaiso Railway will operate and maintain the entire 16 miles of interurban railway, paying a rental to the Gary Connecting Railroad.

Employees Buy Stock. — The campaign started by the Rutland Railway, Light & Power Company, Rutland, Vt., on Oct. 4 for the sale of its 7 per cent cumulative preferred stock to consumers and employees has just closed. This sale presented the first opportunity in the history of the company for the acquisition of that company's stock by consumers and company employees. The sale was conducted entirely by an organization composed of approximately 125 of the latter. During the period the campaign was in force a total number of 422 shares were sold, 233 shares being for cash and 189 on a monthly saving investment plan.

Power Commission Reports Increase in Railway Earnings.—A statement issued by the Hydro-Electric Power Commission of Ontario respecting the Windsor and Essex County electric railways, which were taken over from the Detroit United Railway, claims that during the first seven months of operation by the commission wage advances were granted to employees and surplus revenue increased over the previous corresponding period. The revenue of the corresponding seven months of 1918 was $194,123; 1919, $225,268; and 1920, $296,373. Extra coal costs in an emergency steam plant, operated during a Niagara power shortage, amounted to $27,000, while wages were increased 25 per cent at the outset and later an additional 10 per cent. After providing $49,986 for interest and $11,346 for the sinking fund, the net surplus was $22,335.

$2,134,000 of Notes Offered.—Halsey, Stuart & Company and A. B. Leach & Company, Inc., New York, N. Y., are offering for subscription at 95.25 and interest, yielding about 8½ per cent, $2,134,000 of twenty-year 8 per cent secured gold notes, Series "B." The Middle West Utilities Company through its subsidiary companies operates in the following fifteen states: Illinois, Indiana, Kentucky, Maine, Michigan, Missouri, Nebraska, New Hampshire, New York, Oklahoma, Tennessee, Texas, Vermont, Virginia and Wisconsin. The company's subsidiaries serve 496 communities, having a combined estimated population of 1,317,200. On Oct. 31, 1920, electric customers numbered 221,881, gas 54,784, water 24,778, a total of 301,443 customers for these services alone. Several railway lines are included in the properties that are controlled.

New Bedford Company Takes Over Line.—The trustees of the Eastern Massachusetts Street Railway, Boston, Mass., have voted to recommend to the directors a sale of the so-called Sassaquin line to the Union Street Railway, New Bedford, for a price agreed upon. The line runs between Lunds Corner and the Freetown line. It will take some time to obtain favorable action on the part of various interests involved and to complete the details of the conveyance. Meanwhile, the Union Street Railway company will operate the line by permission of the Eastern Massachusetts Street Railway. H. H. Crapo, president of the Union Street Railway, explains: "If and when the conveyance is completed the Union company will commence to rehabilitate the property and to operate the line in substantially the same way it has been operated during the past year. The Union company has taken on this burden of service without anticipation of present profit and with the knowledge that the existing rates of fare are barely sufficient to cover the operating expenses."

Committee Reports Against Purchase Offer.—A special committee appointed to consider the offer of purchase made by the Western Pacific Railroad to the Sacramento (Cal.) Northern Railway has recommended against the stockholders of the electric line accepting the offer. Miles Standish headed the committee of inquiry. He reported that "the Western Pacific price is inadequate and we are unable to get any better offer." The committee feels that by careful management the road will pay interest on its Class A, B, C and D bonds and also will provide sufficient funds for improvement and betterment. The Sacramento Northern Railway has $5,205,497 of 5 per cent bonds outstanding, in four classifications, and $4,474,607 in stock outstanding. The A and B bonds are paying interest, but the C bonds will not pay interest until July 1, 1922, and the D bonds July 1, 1927. Maturity on all bonds is twenty years from issue, which was 1917. The Western Pacific, it was explained, proposed to issue as against these bonds, at 80 per cent of their par value, paying 5 per cent, first mortgage bonds, maturing March 1, 1946. To absorb the stock the Western Pacific proposed a payment of $26.50 a share on first preferred, $12.50 on second preferred and $5 on common, the par value being $100.

Traffic and Transportation

Further Relief Denied

Commission Refuses to Authorize Straight 8-Cent Fare in District of Columbia—Mr. Ham Dissatisfied

An application of the Washington Railway & Electric Company, Washington, D. C., for an increase in fare to 8 cents straight has been denied by the Public Utilities Commission of the District of Columbia. The commission directs the Washington Railway & Electric Company and the Capital Traction Company to continue the present rate of 8 cents cash, or four fare tokens for 30 cents. That rate is to prevail until April 1 next. In addition, the price of intercompany transfers has been reduced from 2 cents to 1 cent.

Tax Reform Urged

Owing to the inequality of earning power between the two local railway companies a rate of fare which will allow the Washington Railway & Electric Company a return of 6 per cent on its valuation makes possible a considerably higher return to the Capital Traction Company. The new order of the commission is to apply until April 1 only, in the hope that before that date Congress will have enacted the proposed law relieving the companies of the 4 per cent tax on gross earnings and substituting a tax on net revenue in excess of 6 per cent on the value of the property. Referring to the companies' operations for the past six months the commission says:

> The evidence presented by the petitioners at these hearings shows that in the six months' period that has elapsed since the present rate of fare was fixed by the commission, beginning May 1, 1920, the net income of the companies available for return amounted to $510,489, which amount has been verified by the commission's accountants. Included in the operation of the companies for this period, however, are several items of major renewals and replacements of tracks, totaling $225,696 charged to operating expenses, approximately one-third of which, the companies state, is later to be transferred to capital accounts, representing improvement and betterment to track and roadway. For the purpose of this discussion one-third of this amount should be added to the net income of the companies during the past six months.

The commission takes issue with the interpretation being placed by the two companies of the rules laid down by the Interstate Commerce Commission in the manner of handling renewals and replacements of track. On this point its order says:

> The testimony of representatives of both the Washington Railway & Electric Company and the Capital Traction Company shows that they are attempting to follow the rules laid down by the Interstate Commerce Commission in the manner of treating renewals and replacements of track and roadway. These two companies, however, place different interpretations on those rules, the former apparently capitalizing less than the proper amount, while the latter is capitalizing more than the proper amount. It is the intention of the commission to formulate definite rules to govern such cases, but it is not prepared at this time to announce the proper procedure.
>
> It also appears from the evidence that deductions have been made by the petitioners since July 1, 1920, of approximately $3,750 per month for the purpose of paying the federal income tax. Several of the state public utility commissions have recently questioned the propriety of charging the federal income tax as a part of operating expenses. This commission concurs in the opinion that the federal income tax law contemplates that the burden shall be imposed on the corporation and paid out of its net profits and not passed on to the public.

William F. Ham, president of the Washington Railway & Electric Company, expressed disappointment at the decision of the Public Utilities Commission. The order, he said, would reduce the rate of return to a point where no utility can prosper and which is unfair to those who have invested in the securities of the company. Mr. Ham says that it will make it practically impossible to attract new capital for necessary extensions and betterments. He called attention to the fact that the reduction in the price of inter-company transfers, of itself, means a loss of $18,000 a year. He regards the decision, however, as bringing nearer the merger of the capital's two street railway systems.

The commission points out that recent purchases of coal have been made at a price only 72 cents a ton in advance of the contract price.

Court Holds Iowa "Two-Cent" Law Confiscatory

Judge Martin J. Wade of the United States District Court this week handed down a decision branding the Iowa 2-cent fare law as confiscatory and therefore in contravention of the Federal Constitution. His ruling came upon action brought by five electric railways operating within the State.

The plaintiffs in the case were the Mason City & Clear Lake Railroad, the Cedar Rapids & Marion Railroad, the Clinton, Davenport & Muscatine Railroad, the Iowa Railway & Light Company and the Southern Iowa Utilities Company. In 1918 these companies instituted an action against the Iowa Railroad Commission and the Attorney-General of the State and were granted a temporary injunction. During the war period their lines were not taken over by the government and for a time were compelled to operate in accordance with the Iowa law.

F. F. Faville, recently elected to the Supreme Court of Iowa, was appointed a special master in chancery to consider the case. His recommendations were the basis for Judge Wade's ruling. Judge Wade retains jurisdiction in the action, with full power to modify or dissolve the injunction at any future date upon showing by the Railroad Commission that the 2-cent fare law has ceased to be confiscatory.

Birmingham Rates Effective

Seven-cent Fare Placed in Operation—Commission Commends Receiver for Improving Service

A formal order of the Alabama Public Service Commission granting the Birmingham Railway, Light & Power Company the right to charge a 7-cent fare in Birmingham and on its suburban lines was announced on Dec. 29. The commission retains jurisdiction of the case and recites that the granting of the 7-cent fare is without prejudice to any other rates which may be fixed by the commission later, when reports of the operations of the company, as required by the order, are received. The order includes the lines of the Birmingham-Tidewater Railway and the Birmingham-Edgewood Electric Railway, both of which are owned by the Birmingham Railway, Light & Power Company. The new rates took effect Jan. 1.

In its order the commission declares that it will give careful consideration to any agreement for a reorganization of the Birmingham Railway, Light & Power Company which may be made between the receiver and officials of the company and the city officials of Birmingham. The order also requires the continuation of the sale of school tickets and family ticket books on certain of the longer lines.

Quality of Service Commended

The commission commends the receiver for the quality of service maintained in spite of financial difficulties. Its order said in part:

> The increase of 1 cent in the railway fare operated to increase the gross revenue from all departments approximately 7½ per cent, and therefore increased the cost to the public by only that percentage. The increase now applied for would approximately double that percentage and amount to approximately 15 per cent total increase to the public for all services performed by the utilities involved.
>
> Immediately following the increase of the railway fare to 6 cents twenty-five safety cars were bought and new motor sets purchased for installation on the cars on hand. The railway shops have since been operated to their capacity. The new cars were placed in operation in January, 1920. The old cars thereby released were put through the shop as rapidly as its capacity would permit, and thereafter placed in operation on one line after another, and this process has continued without interruption until nearly all of the motor equipment has been put in good condition. Later nine practically new trailer cars were purchased and are in operation. Recently fifteen additional safety cars have been purchased and put in operation. As a result there has been a constantly increasing improvement in railway service since the fare was increased to 6 cents. Our investigation convinces us that the existing service is, with one or two exceptions, of a high standard and that improvement is still in progress.
>
> We find that the property as a whole had, during the receivership, earned slightly less than its taxes, bond interest and sinking fund obligations. The cash conditions of the receivership estate has reached an acute stage that demands relief. We recognize, too, that there are unusual burdens resting upon the street railways of the Birmingham district in these particulars: (a) The average hauls are long; (b) the traffic is unbalanced on most of the lines; (c) railroad crossings are numerous; (d) the competition from jitneys and private automobiles has been excessive.
>
> The facts stated above are established by the undisputed evidence in the case. Upon the whole we are convinced that the property has been managed with a high degree of efficiency and economy, and that the railway departments have been furnishing service below the true cost.

Would Charge 10 Cents

San José Companies File Applications for Increased Fares, Alleging Big Deficits in Past Year

Declaring that for the last nine months its operation has resulted in a loss of $235,645 the Peninsular Railway, San José, Cal., has applied to the State Railroad Commission for authority to increase passenger fares. The company seeks to increase its 6-cent and 8-cent fares to 10 cents and the charge for school children's 46-ride commutation fares from $1.85 to $2.22. It also proposes the sale of tokens, good for an unlimited time and transferable, for 7 cents each. These tokens will be honored for transportation within any 10-cent fare zone. They must be purchased five or more at a time. The company's rules and regulations governing the issuance and acceptance of street transfers are not to be changed.

NINE MONTHS' LOSS $235,645

According to a financial statement filed with the application, for the nine months ending Sept. 30, 1920, the company's operating revenue totaled $265,370; non-operating revenue, $27,418, a total of $292,789. Operating expenses amounted to $248,996; taxes and depreciation to $21,968; fixed charges and miscellaneous debits $257,469. With the expenses totaling $528,434 the company points out that its net loss for the period amounted to $235,645.

The San José Railroads, which also furnishes service in San José, also applied for authority to increase its fares, claiming that in the nine months ending Sept. 30, 1920, it had sustained a loss of $89,432. A 10-cent fare is proposed for all lines now charging 6 cents and 12-cent and 18-cent fares are proposed in place of the 10- and 15-cent fares now being collected on certain lines. The 15- and 20-cent fares are to be increased to 18 and 24 cents, respectively, according to the plan of the company.

The sale of tokens at 7 cents each, transferable and good until used, is also provided for in the company's proposed schedule. It is likewise proposed to sell thirty-ride family commutation tickets between any two stations the one-way fare of which is 12 cents or more for twenty times the one-way fare. Under the proposed new schedule school children's forty-six-ride tickets will be increased in cost from $1.85 to $2.22. The $2.70 ticket for school children will be reduced to $2.63 and the $3.60 ticket to $3.48.

No Increase Now in St. Paul

The City Council of St. Paul, Minn., has taken steps which will postpone for a month at least an increase in fare by the St. Paul City Railway, a subsidiary of the Twin City Rapid Transit Company, from 6 cents to 7 cents. The Council has approved the report of E. W. Bemis, utility expert, who suggested that the 6-cent fare continue until the early part of this year, when he would recommend further action based on what revenue will be necessary to enable the company to earn a fair return and to finance its paving and other extensions.

The company, according to the report, is earning a 6.6 per cent return on an actual valuation of $11,000,000. The outlay for paving and extensions to be made by the company is estimated at $2,000,000.

Mr. Bemis suggested that some of the needed revenue might be obtained from the depreciation fund and that the balance be obtained by a note from the company to the city, giving the city a lien, equal to the amount of paving, on the company. In his report Mr. Bemis indicated that the neutral zone should be continued, and also advocated the skip-stop, providing the stops were at proper distances apart and properly located.

Asks More in Spokane

That the Spokane & Eastern Railway & Power Company on its Spokane city lines during the first ten months of 1920 sustained losses in operation, including taxes but not interest, of $76,492 is asserted by F. E. Connors, vice-president and general manager, in a petition filed recently with the Public Service Commission of the State of Washington asking that fares be increased from 6 cents to 8 cents. The operating loss while the road, then the Spokane & Inland Empire Railroad, was in the hands of Mr. Connors as receiver is stated in the present petition to have been $250.

The large increase in the deficit is credited to the added expense of operation and the necessity of adding improvements required to rehabilitate the system. Prior to the present ownership, it is stated that the road had been allowed to deteriorate because of the inability to earn enough money to keep it up in proper shape. Further large expenditures will be necessary to keep the property in good condition. The funds for this purpose cannot be had unless an increase in fares is granted.

Like the Washington Water Power Company, the Spokane & Eastern Railway & Power Company is confronted with a request from its carmen for a shorter working day. Platform men of other Northwestern cities are working shorter hours, but in this as in the matter of keeping up the property the railway is handicapped by a lack of money which can only be supplied by increased fares. The petition also states that higher fares are in vogue in other Northwestern cities. The petition, which was filed by Graves, Kizer & Graves, attorneys for the company, seeks to reopen the old fare case heard April, 1919, when the fare was raised from 5 to 6 cents.

The city legal department on Dec. 23 filed with the Public Service Commission a formal protest against permitting the company to reopen the old fare increase case.

Bus Regulation Asked

Council Committee Urges that Restrictions Be Placed on Operation of Jitneys in Hartford

A report has been submitted to the City Council of Hartford, Conn., by the special committee of that body which has been investigating the railway-jitney situation in Hartford. The commiteee urges that the present bus competition be removed. It contends that, if steps are taken by the city authorities to aid the railway through regulation of the jitneys, the city has the right to insist upon improved service and the payment of deferred maintenance charges.

The committee's report follows:

> Your committee, while recognizing the popularity of the jitneys with a large number of our citizens, feels strongly that the continued prosperity and development of our city is absolutely dependent upon a permanent, responsible and efficient transportation system. While the service furnished by the Connecticut Company may be inadequate at certain hours, we believe that the great majority of our citizens can only be transported by means of the trolleys with any degree of regularity and efficiency, especially in the winter months.
>
> #### RAILWAY CALLED ESSENTIAL
>
> We cannot fail to recognize that large sections of our city have been built up because of their proximity to trolley lines; that the trolley company has made large, permanent local investments in its tracks, buildings and equipment, and under its charter and franchise obligation can be compelled to furnish continuous service, provided it secures sufficient revenue to be able to operate. From our conferences with officials of the trolley company we are satisfied that because of the present high costs of operation and equipment it will be impossible for the company to continue operation unless the jitney competition is restricted. From such information as we have received from the officials your committee is satisfied that even in the city of Hartford and with the 10-cent fare, the local lines will not receive sufficient revenue to more than break even between receipts and actual operating costs, provided the Connecticut Company pays its Hartford taxes, its percentage of gross receipts and meets its obligations in the matter of paving the portion of the city streets on which its lines are located. This does not include repairs to trackage, which in certain parts of the city are grievously needed.
>
> If on the other hand, the present jitney competition is removed and the trolley receives sufficient revenue, the city has the right to insist upon improved service and the payment of deferred maintenance charges. In the case of Wethersfield Avenue and Windsor Avenue paving for example, it has been impossible for the city to insist on the performance of this work as the company had no funds which could be used for the purpose and could not borrow them.
>
> The six new routes designated in the proposed amendment to the ordinance for the most part are parallel and would be in direct competition to the trolley lines. They avoid Main Street between Charter Oak Avenue and the tunnel, but provide for the operation of jitneys through such narrow and already congested streets as Prospect Street, Allyn Street, Ford Street and Trumbull Street. These streets are all so congested that they are now receiving special consideration from the police board with a view to further restriction of traffic.

Council Cancels Duluth Referendum

The City Council of Duluth, Minn., on Jan. 3 rescinded its action calling a special referendum for Feb. 3 to place a proposition for a 6-cent fare again before the people. The Council decided on Dec. 24 to call a referendum election providing the expenses of the same should be borne by the Duluth Street Railway, but changed its mind when representatives of the Federated Trades and Labor Assembly charged that the Council would be violating the corrupt practices act if it conducted an election the expenses of which were paid by a private corporation. Herbert Warren, general manager of the company, has announced that the railway is operating at a loss and that the cost of operation must be curtailed or the fare raised. The voters have twice rejected a proposal to allow the company to raise its fare.

Arkansas Bureau Busy

A. G. Whidden, Manager of the Public Relations Section, Waging an Active Campaign of Education

An active campaign is being waged by the recently created Public Relations Section of the Arkansas Utilities Association to inform the people regarding the public service corporations operating within the State. A. G. Whidden, manager of the Public Relations Section, is using for this purpose paid advertisements in the newspapers of Pine Bluff, Fort Smith and other cities. He is also issuing a series of bulletins discussing the utility question, in which he emphasizes the essential nature of electric railways and other utilities.

In discussing the present status of Arkansas utilities recently, Mr. Whidden said that the principal trouble with public utilities throughout the country today is that they have been so starved by lack of adequate compensation that their plants have run down, and many are unable to meet demands made upon them.

LESSON COSTLY FOR PUBLIC

Utility operators could see coming just such trouble as some communities are experiencing, and tried to avert it by appealing to the public and to city councils for fair and equitable rates, so that the high operating expenses could be met, and new generators, transformers and other machinery purchased, said Mr. Whidden. These appeals were not heeded. The people, unfamiliar with operating costs, did not appreciate the situation, nor realize how the public would be affected. So, today, both the public and the utilities are paying the penalty. Mr. Widden continued:

> The utilities are partly responsible for the situation because of their failure to use advertising space in the newspapers to inform the public concerning constantly increasing costs of operation. They realize this now, and, having confidence in the fairness of the public, plan to present their case to the people through newspaper advertisements, and other mediums of publicity.
>
> Of course there will be some to contend this is no time to increase rates, but those utilities that have been starved for years must have some relief if they and the communities they serve are not to suffer more than they have.
>
> Those manufacturers and others who advanced prices to meet higher costs of production can afford to say, "This is no time to advance rates." They have had their necessary increases, and with decreasing production costs, probably may reduce rates or prices. But the utilities are in a different position. They have not had advances proportionate to higher costs, and everything they use—labor, fuel, material—has gone up. The result is they are just about starved out and their efficiency impaired. They must have relief in the way of adequate rates if they are to survive and provide the service necessary to continuous development of the community.

Under the caption, "Public Utilities Pay One-Fifth of Taxes," one of the "ads" sent out by Mr. Whidden says:

> Public utility companies pay 20 per cent of all taxes collected in Arkansas!
>
> This surprising fact is shown by the 1919 assessments. The total valuation of all property was $588,161,065. Of this amount the utilities represented one-fifth, or $115,656.474
>
> Consider what this means: All lumber mills, all mines, all factories, all buildings of whatsoever nature, all improved and unimproved land—everything in the state, except public service companies, paid only $4 in taxes for every **$1 paid by the public** utilities.
>
> On the basis of 33 mills—state, county, city and special levies in Little Rock—the utilities of Arkansas paid in taxes last year $3,816,663.
>
> On the same basis, all other property in the state paid only $15,592,652.
>
> The utilities actually paid more than $3,816,663, because they are subject to taxes not levied against other property owners—such taxes as pole, corporation, franchise, and other special levies.
>
> If all the utilities in Arkansas were forced out of business by reason of inadequate rates or unjust legislation the people of Arkansas not only would be deprived of the comfort, convenience, protection, pleasure and profit provided by the operation of the light, telephone, water, gas and railway companies, but the rate of taxation would have to be increased to make up the four million the utilities pay toward public improvements, governmental expense and schools.

Crossing Regulations Laid Down

Operation of one-man cars on thoroughfares crossing steam railroads at grade is prohibited in proposed regulations issued recently by the Massachusetts Department of Public Utilities. Exceptions are made to grade crossings at which all train movements are protected by the railroad crew or where a gateman is employed.

Justice John C. Crosby of the State Supreme Court has ruled against the petition of certain employees of the Eastern Massachusetts Street Railway for an injunction to restrain the public trustees from the operation of one-man cars. A demurrer to the petition was filed by the company, in which it was pointed out that the Department of Public Utilities has decreed that the one-man cars are not a menace to public safety as claimed by the petitioners. This demurrer was sustained by the court.

The new rules governing the operation of the cars over grade crossings are the result of several months' study by the inspection bureau of the commission. They demand, in Regulation 1, that every street railway car on approaching a grade crossing shall be brought to a full stop 100 ft. from the railroad tracks. This stop, it is stated, shall be for the purpose of ascertaining whether or not the machinery of the car is in perfect condition for emergency handling.

The car thereafter must be worked slowly to the railroad tracks and again brought to a stop. The operator may not then proceed until he has ascertained that the way is clear and that there is no danger of a train approaching from either direction. This last stop, it is provided, shall not be deemed necessary where train movements are protected by train crews.

Another of the new regulations provides that at all crossings where no gateman or flag tender is employed, unless it be one where movements are protected by train crews, the conductor must leave his car, walk ahead to the tracks and stand there until his car has passed over.

A fourth regulation provides that at all grade crossings there shall be installed a trolley guard so arranged that if the trolley leaves the wire it may be caught by the guard.

Birney Cars Installed on Lines of Heavy Traffic

Birney safety car operation was started on one of the lines of the Youngstown (Ohio) Municipal Railway on Jan. 1. The line selected for the first use of this type of equipment in the Ohio city, the Wilson Avenue and East Youngstown line, serves a large residential section with heavy industrial traffic morning and evening in the city. It has met with considerable automobile competition. Heretofore the base schedule for this line has provided a ten-minute headway with a five-minute headway during the morning and evening peak load periods.

With the safety car in use the all-day service has been placed on a five-minute headway with the peak load service on a two-and-a-half minute headway, the additional morning and evening service being supplied by the old style of cars alternating with the safety cars.

Twelve Birney cars have been assigned to the line, ten being required by the base schedule and two being spares. Including this service forty-four safety cars are in service on the lines of the Pennsylvania-Ohio Electric Company and associated companies in Youngstown, Ohio, and New Castle and Sharon, Pa.

The new service in Youngstown is of special interest because of the problem that is presented in the use of safety cars for the heavy and concentrated industrial traffic and the effect of the frequent service on the automobile competition.

Transit Problem Discussed

C. I. Brooks, chairman, committee on transportation, Miami, Fla., recently submitted the findings of that committee before the Rotary Club. In summing up the transportation problem in Miami he stressed the importance of the motor vehicle. In this connection he spoke of the parking practice in Miami and suggested a parking plan such as is carried out in Cleveland, Ohio. On the street railway subject he declared that the people would have an opportunity to express their choice between the trolleys and the jitneys. He believed that buses were not a dependable system of transportation, but that a street railway system should be in operation which would give not only transportation advantages but would also mean the development of city property.

Transportation News Notes

Seven Cents in Columbus.—The Columbus (Ga.) Railroad has raised its fare from 5 cents to 7 cents under the terms of an order issued by the State Railroad Commission. Fifteen tickets are sold for $1. Thirty school tickets are sold for $1.

Ten Cents Asked in Ardmore.—The Ardmore (Okla.) Railway has applied to the Oklahoma Corporation Commission for authority to charge a 10-cent cash fare on its Ardmore lines. This is the first city electric line in the state to ask for a 10-cent fare on its city system.

Would Raise Zone Rates.—The Valley Railways, Lemoyne, Pa., has notified the State Public Service Commission of its intention to raise its fare from 7 cents to 8 cents in each zone. In October, 1918, the fares were increased from 5 cents to 7 cents. The railway operates between Lemoyne, Carlisle and other points in the Cumberland Valley.

Oklahoma Interurban in Operation.—The Northeast Oklahoma Railroad, Miami, Okla., has been completed and has begun operation. The road, which is twenty-three miles in length, will serve the towns of Miami, North Miami, Commerce, Cardin, Picher, and Century, Okla. J. F. Robinson is president. The other officials are: W. H. Trapp, vice-president; H. B. Cobban, secretary-treasurer and general manager; and H. M. Myers, auditor.

Six Cents in Victoria.—A 6-cent cash fare is now being charged by the British Columbia Electric Railway, Vancouver, B. C., on its lines in Victoria. Six tickets are sold for 35 cents, and ten school tickets for 25 cents. Universal free transfers are retained. The fare was formerly 5 cents cash, five tickets for 25 cents. The railway several months ago applied to the city authorities for permission to charge a 6-cent fare, later amending its petition to ask a rate of 7 cents.

Ten Cents in Framingham.—By authority of the Massachusetts Department of Public Utilities the Boston & Worcester Street Railway, Framingham, has raised its cash fare from 7 cents to 10 cents on several of its lines. The new rate schedule substitutes a 5-cent cash fare for certain 4-cent tickets and abolishes the fifty-trip ticket between Overbrook and Chestnut Hill, formerly sold for $6.75. There is no change in the length of fare zones. It is estimated that under the new rates the railway will receive $30,000 additional revenue annually. The company had a deficit of $58,624 for the first ten months of 1920, and for the past two years has failed to earn operating expenses, taxes and interest.

"Safety First" in Los Angeles.—Carrying the message of "safety first" to 5,000 school children of Los Angeles, Cal., every week the Los Angeles Railway and the Pacific Electric Railway are at present co-operating in a campaign against accidents of all kinds. The railways are employing H. H. Mathieson, safety engineer, to speak before the school children and to present a "safety first" motion picture film. The work is being conducted with the approval of the Los Angeles school board and under the direction of the superintendent of schools. The film shows how accidents happen and how they can be eliminated by eliminating carelessness. It preaches the safe way as the right way and covers all classes of accidents.

A Unique New Year's Greeting.—At the suggestion of W. H. Boyce, general manager of the Beaver Valley Traction Company and the Pittsburgh & Beaver Street Railway, New Brighton, Pa., the operating force of these companies adopted a unique method of wishing the car riders a "Happy New Year." Their "card" took the form of an open letter published in the New Brighton newspapers as a paid advertisement. Over the signatures of all the employees of the companies the letter read: "We wish our public a merry, merry Christmas and a very happy New Year. We have tried to do our duty during the year passing out now; and we look forward to 1921, hoping that our work and service will continue fully to meet your approval."

Fares Up on "Panhandle" Lines.—The City Railway, a subsidiary of the West Virginia Utilities Company, Wheeling, W. Va., has been authorized by the State Public Utilities Commission to raise its rates as follows: for passengers within the city from 5 to 8 cents, six tickets are to be sold for 40 cents and school tickets at one-half the regular fare. The former express rates were: up to fifty pounds, 10 cents; from fifty-one to 100 pounds, 25 cents. The new rates are: up to ten pounds, 12 cents; from ten to twenty-five pounds, 24 cents; from twenty-five to 100 pounds, 30 cents; for each additional 100 pounds, 12 cents. The rates charged in the interurban line of the Wheeling Traction Company also were increased by 6⅔ cents between Wheeling and Moundsville. The rates between intermediate points were increased proportionately. The express rates are graduated from 18 cents for one pound, to 30 cents for 100 pounds.

Seven Cents in Fort Smith.—The Fort Smith Light & Traction Company, Fort Smith, Ark., has raised its fare from 6 cents to 7 cents. Children between the ages of five and twelve years are carried for 4 cents each. The new rate was made permanent by the State Corporation Commission unless otherwise ordered. The 7-cent fare went into effect automatically after thirty days' public notice, as required by the state law. A conference was held at which representatives of labor unions, civic organizations and city officials were present and the matter was fully discussed. At the conclusion of the meeting a resolution was adopted that no protest should be filed with the Corporation Commission against the 7-cent fare; therefore the rate automatically went into effect. The management took the public into its confidence and gave it full information regarding the railway's operating and financial problems.

New Publications

Engineering Electricity

By Ralph G. Hudson. 190 pages, illustrated. John Wiley & Sons, New York, N. Y.

This book, written primarily for students specializing in branches of engineering other than electrical, contains a brief and concise exposition of the fundamental principles and the customary applications of electricity and magnetism. Enough descriptive matter is included to provide material for a mental picture of electrical devices. Theories are developed with the aid of mathematics where exposition would be long and involved.

The Discovery of Electromagnetism

Published for the Oersted committee at the expense of the Belgian State by Absalon Larsen, Copenhagen, 1920.

The Belgians celebrated during last year the centennial of the discovery of the relation between electricity and magnetism, announced by Prof. J. C. Oersted on July 21, 1820. In connection with this celebration there has been published a pamphlet containing a résumé of the facts attendant upon this great discovery, and giving reprints in the original languages from a number of articles commenting upon the discovery, published in scientific journals at the time of its announcement.

Coal, Iron and the War. A Study in Industrialism, Past and Future

By Edwin C. Eckel, late Major of Engineers, United States Army. 375 pages. Henry Holt & Co., New York, N. Y.

This treatise is the result of a study of the working of economic laws relating to the production, distribution and utilization of these basic elements of the nation's wealth. It is not in any sense technical, but is based on numerous data, and goes to show how world peace is intimately involved with economic and industrial conditions. The book furnishes a stimulus to thought, and in view of the dependence of the electric railway business on coal and iron it might well be carefully read and studied by progressive managers and engineers.

Personal Mention

Governor Picks Mr. Cadle

Chief Engineer of the New York State Railways Appointed Superintendent of Public Works

Public service has borrowed from the electric railway industry one of its most able executives in the person of Charles L. Cadle, chief engineer of the New York State Railways, who has just entered the cabinet of Governor Nathan L. Miller of New York, as Superintendent of Public Works. Mr. Cadle's appointment was among the first to be announced by Governor Miller, who took office on Jan. 1. As Superintendent of Public Works he will have charge of many state improvements, the most important of which is the Barge Canal.

C. L. CADLE

The news of Mr. Cadle's appointment has been taken as an evidence that the new Republican administration intends to co-operate with business interests in working out a constructive program of relief for the state's utilities, including electric railways. The new Governor has already intimated that public utilities are to receive consideration at his hands. It is expected that any reasonable claim which either the utilities or private business will put forth will receive attention.

Mr. Cadle has long been identified with the New York State Railways, which, in addition to operating interurban lines, owns the city systems in Rochester, Syracuse and Utica, first as electrical engineer and more recently as chief engineer. He went to Rochester about thirteen years ago from Cleveland, Ohio, where he had been for two years general manager of the Electric Railway Improvement Company. For about a year previous to that time he was employed in the power department of the Cleveland Railway. For several years he served as electrical engineer of the Rochester lines and was then promoted to chief engineer of those lines. He subsequently became chief engineer of the entire system of the New York State Railways. For a number of years Mr. Cadle has made his headquarters in Rochester.

Association work has for years been of vital interest to Mr. Cadle. He has been a member of the power distribution committee of the American Electric Railway Engineering Association, serving for several years as chairman, and has also served on the executive board of the Engineering Association. He was a member of the American Association committee to confer with the Bureau of Standards on the electrical safety code in 1915 and 1916, and was later made chairman of the committee of the Engineering Association to confer with the bureau on that subject. At the Atlantic City convention last October he was elected first vice-president of the Engineering Association.

S. S. Crane Feted

Scott S. Crane, general manager of the Altoona & Logan Valley Electric Railway, Altoona, Pa., was recently tendered a dinner by the employees of the system, the occasion being the twenty-fifth anniversary of Mr. Crane's connection with the company. When Mr. and Mrs. Crane appeared at the railway's office in answer to a telephone message they found more than 150 employees gathered around the banquet table, two places being reserved for the guest of honor and his wife. Mr. Crane was presented with a phonograph and 100 records, the gift of his fellow workers, and with an autograph album containing the name of every employee of the company. Mrs. Crane was presented with three large bouquets. Commenting editorially upon the event, the Altoona *Mirror* said:

"It was a fine tribute to Mr. Crane, personally and in his capacity as the general manager of the trolley lines. It shows that he has not only the confidence and co-operation of the men who work under him but that he also has their esteem and affection. Such manifestations of good feeling between employer and employee have been all too rare in recent years in many lines of human activity, although it has existed in the Logan Valley family.

"Mr. Crane is entirely worthy of the honor which the men and their families paid him last night. He has always applied the Golden Rule to his dealings with his subordinates, and that is a policy that invariably wins. When other executives have experienced trouble he has been rewarded with service, and the local public has been the real beneficiary."

O. D. Mudgett Promoted

Made General Manager of the Androscoggin Electric Company, Succeeding F. D. Gordon

Electric railway men of the New England section have recently been congratulating Frederick D. Gordon, formerly general manager of the Androscoggin Electric Company, Lewiston, Me., upon his appointment as general manager of the Cumberland County Power & Light Company, Portland. Brief mention of Mr. Gordon's appointment was made in a recent issue. Following the resignation of Mr. Gordon from the Lewiston company several promotions have taken place in that organization, the chief one being that of O. D. Mudgett, who has been made general manager to succeed Mr. Gordon.

F. D. GORDON

As general manager of the Cumberland County Power & Light Company Mr. Gordon will have charge of a property capitalized at more than $2,000,000 and serving a population of 100,000 persons. The railway department of the company operates 106 miles of track, including a number of interurban lines. Mr. Gordon succeeds A. H. Ford, who resigned in the fall of 1919. Since the resignation of Mr. Ford the company has been without a general manager, the heads of the several departments having supervision of the work.

O. D. Mudgett, who succeeds Mr. Gordon at Lewiston, joined the Androscoggin Electric Company about ten years ago. He is a native of Gilmanton, N. H. After obtaining his early education in that city he studied electrical engineering at the New Hampshire State College. Following his graduation from that institution he went to East Pittsburgh, Pa., where he entered the employ of the Westinghouse Electric & Manufacturing Company. He was later transferred to Boston, where his work consisted of commercial engineering. He then joined the Belfast Gas & Electric Company, Belfast, Me. A few years later he entered the employ of the Lewiston company, serving continuously with that organization up to the present.

Mr. Lewis in Buffalo

Kenneth R. Lewis, formerly general car inspector of the Hudson & Manhattan Railroad, New York, N. Y., has assumed the duties of engineer of equipment of the International Railway, Buffalo, N. Y. The position of engineer of equipment is a newly created one. Mr. Lewis will co-operate with J. W. Hulme, superintendent of equipment, in supervising the maintenance of the railway's rolling stock. His work will consist largely in the standardization of parts and in the handling of tests of all materials used in the upkeep and equipment of the cars.

Mr. Lewis is a native of Washington, D. C., where he was born in 1888. He obtained his education in the Washington grammar schools and the McKinley Manual Training School. He has since specialized in electrical engineering and has completed several courses on that subject. He began his railway experience with the Washington & Old Dominion Railway in the fall of 1906. In the following year he joined the New York Central Railroad, serving as an inspector of locomotives in the electrified zone. In 1908 Mr. Lewis accepted a position with the Hudson & Manhattan Railroad, and, after serving in various positions, he was promoted to general car inspector.

Interurban Officials Promoted

Lawrence Meservie has been appointed a division superintendent of the Monongahela Valley Traction Company, Fairmont, W. Va. Mr. Meservie will have charge of the interurban lines entering Fairmont and of a portion of the city system. The creation of the new position and the appointment of Mr. Meservie resulted from a substantial increase in interurban traffic. Mr. Meservie has for many years been a trainman on the interurban lines.

Theodore E. Fitzpatrick has been made an assistant superintendent of transportation of the company. Mr. Fitzpatrick will assist Carl B. Johnson, superintendent of transportation, and will co-operate with A. I. Horton, who is also an assistant to Mr. Johnson. Mr. Fitzpatrick has been in the employ of the railway since 1903. In his new position he will supervise the regulation of traffic on all city routes, as well as on a number of interurban lines.

J. W. Walker has been appointed superintendent of the Traction Light & Power Company, a subsidiary of the Union Traction Company of Indiana, Anderson, Ind. Mr. Walker succeeds J. B. Shaedel, who resigned recently. He is a graduate of Purdue University and was formerly in the employ of the United States Steel Corporation at Gary, Ind.

T. H. Ceperley, who for the past twelve years has been chief operating engineer of power and substations of the Albany Southern Railroad, Albany, N. Y., has resigned on account of ill health and expects to spend the winter in the South. Mr. Ceperley will re-enter the electrical field in the spring. He was formerly connected with the Newburgh Light, Heat & Power Company, as chief engineer of the Newburgh plant, and prior to that with the Fonda, Johnstown & Gloversville Railroad.

Changes in St. Louis

Major R. J. Lockwood Made Assistant Manager of the United Railways in Charge of Purchases

To secure an increase in operating efficiency, Rolla Wells, receiver of the United Railways, St. Louis, Mo., has somewhat reorganized the company's executive personnel. Major Richard J. Lockwood has been appointed assistant manager. Major Lockwood will report to Colonel A. T. Perkins, general manager, relieving him of many duties, and thus enabling him to give his attention to more important matters. Questions pertaining to supplies and purchases will come under Major Lockwood's direct supervision.

MAJOR R. J. LOCKWOOD

The responsibilities of Walter E. Bryan, superintendent of power, and C. L. Hawkins, engineer maintenance of way, have also been extended by Colonel Perkins. The general manager has himself absorbed the duties formerly performed by the chief engineer.

Major Lockwood, the new assistant manager, is a newcomer in the electric railway field, most of his experience having been in steam railroading. He was born in St. Louis thirty-eight years ago. Shortly following his graduation from the engineering department of Washington University, St. Louis, in 1904, he entered engineering and construction work. After holding engineering and executive positions with several roads he became vice-president and general manager of two subsidiary lines of the "Frisco" system in Louisiana. He later served as vice-president and manager of the Appalachicola Railroad in Florida.

During the war Major Lockwood served with Colonel Perkins, who commanded the Division of Combat Railways in France. He rose from a private in the officers' training camp at Fort Oglethorpe through the grades of second lieutenant and captain of Field Artillery, captain and major of Engineers and finally and until the signing of the armistice was made chief engineer of the Division of Light Railways and Roads, A. E. F. In the meantime he was in the thick of things in the Chateau Thierry, St. Mihiel and other engagements.

Walter E. Bryan, superintendent of power, was born in St. Louis on Oct. 21, 1885. Graduating from Washington University in 1907 with the degree of B. S. in electrical engineering he entered the power department of the local railway system. After serving for a time as draftsman he was appointed electrical foreman in charge, under the superintendent of power stations, of substations and electrical work in the power department. In August, 1910, he left the company to become an electrical engineer for the United States Incandescent Lamp Company, but in March, 1911, he returned to the United Railways. In the following year he became assistant superintendent of power stations. Later in the same year he was promoted to superintendent.

Carl L. Hawkins, engineer maintenance of way, is also a Missourian by birth. After completing a course in electrical engineering at Washington University, he was employed by a firm of contractors on railroad construction work in Florida. Shortly thereafter he returned North and entered the service of the United Railways as an engineer in the track department. He was made chief engineer of that department in 1911, subsequently being promoted to engineer maintenance of way.

Charles A. Pohl has been appointed chief engineer of the Niagara Gorge Railroad, Niagara Falls, N. Y. Mr. Pohl is a member of the firm of Bogart & Pohl, civil and consulting engineers, New York City.

M. H. Pitman has been appointed service superintendent of Georgia Railway & Power Company, Atlanta, Ga. In this capacity Mr. Pitman has charge of the gas shops, the gas repair shop, and the gas meter shop, in addition to the electric and steam meter department. He has been connected with the company for a number of years.

Frederick E. Nelson has joined the Twin City Rapid Transit Company, Minneapolis, Minn., as publicity representative. Mr. Nelson has been appointed acting general passenger agent of the Twin City lines during the temporary absence of W. O. Clure, who is now recovering from injuries received several weeks ago in an accident. Mr. Nelson is a newspaper man by profession and at one time or another was connected with several papers in the Pacific Northwest. Since his discharge from military service he has served on the Minneapolis *Journal* and more lately on the Minneapolis *News*.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Prices of Overhead Trolley Line Material Decline

Lower Raw Material Cost a Large Factor—Demand Rather Light and Deliveries Favorable

With the copper market continuing on its downward march in an apparent attempt to set new low price records recently, the expected decline in overhead trolley line material has come about. At this writing electrolytic copper can be purchased as low as 12.50 cents per pound delivered, though large producers are nominally asking 13 cents over the first quarter.

Several of the large manufacturers of trolley line material reduced their prices on January 3, the reduction in two instances averaging 5 per cent on the whole line of ears, crossings, splicers, hangers, etc. In a third case the price drop amounted to about 15 per cent on the same date. Another large manufacturer has not announced any price change as yet.

Demand for this class of supplies on the whole is rather light, though in some instances good sales are reported, on behalf of maintenance work of course. Deliveries are favorable and range from 10 days up to an extreme period of three or four weeks.

Wiring Supply Prices Lower

Pipe, Loom, Armored Cable and Fittings Reduced with Lower Steel and Cotton Costs

Just before the year closed important revisions downward were made on several items of wiring supplies. The first of the independent mills making merchant pipe, closely related to rigid conduit, dropped its price to corporation level on Dec. 31, and was followed by other mills early in January. That was the final step to bring the independent steel market to corporation levels, thereby leaving only one steel market. Stocks are generally pretty well built up but in some sections quite spotty.

Steel strip for flexible armored conductor dropped about 20 per cent late in December so that manufacturers now are quoting price reductions of around $15 per 1,000 ft. of No. 14 two wire. Stocks are large on certain makes with rather low jobbers' prices resulting. Conductor bushings, etc., are also lower, smaller sizes about 33 per cent and larger sizes 8 per cent.

Non-metallic flexible conduit prices are off about 30 per cent, the discounts changing 15 points. Cotton material entering into the make-up of loom is quoted as much as 50 per cent lower in some instances. Stocks are heavy.

Rubber-covered wire prices while low are apparently holding, from $8.25 to $8.75 being a good ruling price in New York City for large lots of No. 14. Weatherproof, No. 14, in 250-lb. lots is quoted at from 27 to 29 cents in New York City.

Long Deliveries of Railway Type Resistance Grids

Demand Is Large and No Stocks Exist Either With Manufacturers or Railways—Prices Firm

Current buying of resistance grids on the part of electric traction companies is heavy and the supply poor. An analysis of individual orders, it is stated, shows that electric lines are buying close to their requirements but nevertheless the total demand is large. For one thing railway stocks of reserve grids are known to be low. With cold weather at hand street car lines are loath to face the possibility of heavy snows with consequent burnouts and breakage of resistance grids without having a fair stock to make replacements.

STOCKS EXPECTED TO BE BETTER

Unfortunately deliveries of grids are running long and rush orders have scant chance of meeting with immediate attention. In fact one of the largest manufacturers is apportioning deliveries on a percentage basis. In view of this condition electric railways are probably anticipating their needs more than would otherwise be the case. Stocks of railway type grids virtually do not exist with manufacturers now, in spite of the fact that one of the latter had as high as 100,000 in stock recently. Deliveries vary greatly according to the particular grid desired, but range as long as three or four months at present and in isolated instances orders have been unfilled as long as seven months. It is expected that within the next three or four months, however, stocks will be well built up in spite of the fact that a good running volume of business is anticipated right along.

The chief problem with which producers have had to contend has been to obtain grey iron castings. The supply is now improving slightly though it is still far from normal. Prices have undergone no change. It is pointed out that the large rejections and losses through breakage on grids constitute an excessive overhead, and this combined with the undiminished cost of castings and other material, manufacturers say, precludes lower prices for some time to come.

No General Drop in Gear Case Prices

One Manufacturer Lowers Price of Sheet Steel Product but No Reductions by Others

Although one of the large manufacturers of gear cases reduced the price of sheet steel cases about seven per cent on Jan. 3, this drop has not been followed by a similar action on the part of other producers, so far as can be learned.

Steel mills have lowered sheet steel prices appreciably within the past month but seemingly the chief reasons why this reduction has not been passed on to gear case consumers are current stocks of high priced material purchased some time ago and high labor costs. These two factors, according to a leading producer, are sufficient to prevent any price decreases on its product for nearly three months to come.

Orders are holding up fairly well, in some instances a slightly lessened demand being noted recently, but on the whole the total volume of gear case business seems to compare well with former years. Deliveries, however, are running longer than usual, especially on malleable cases. The latter have undergone no price change and lower quotations are not expected while the raw material remains so high in price and uncertain as to supply.

Short Supply of Coal in 1920

Scarcity Due to Coal Miners' and Railroad Strikes, Car Shortage and Foreign Buying

One of the chief difficulties with which public utilities and manufacturers had to contend during 1920 was an insufficient and irregular supply of fuel. An extraordinary and long continued chain of circumstances was to blame for this scarcity.

Following the coal miners' strike in November, 1919, surplus stocks were reduced to a comparatively low point. Then, starting with the first of the new year, a car shortage prevailed that lasted through the greater part of the year and seriously hampered efforts of producers to move coal. A wage increase of 27 per cent to coal miners went into effect on April 1, thus increasing the cost of production. Early in the same month occurred the outlaw switchmen's strike on the railroads, and this completed the demoralization of freight transportation. As large consumers were unable to obtain enough coal on contract delivery they entered the open market for deliveries almost at any price.

Successful foreign buying competition further shortened supplies, and as a result speculation and manipulation served to send coal prices skyward. In midsummer utilities paid as high as $16.50 to $23 per ton for coal at New York. At times many of the street railways were on the verge of closing down for lack of coal. Herculean efforts on the part of all concerned and heroic measures that were adopted prevented this, however. Among the latter were orders from the Interstate Commerce Commission virtually embargoing exports of coal, granting regional priorities to districts such as New England that were hardest hit, reserving the preferential use of open-top cars for shipment of coal, and giving the use of assigned cars to public utilities. These measures, coupled with a gradual improvement in transportation, relieved the situation the latter part of the year. Prices have recently been on the downgrade and early in December the last of the preferential car orders was rescinded.

Copper Market at Lowest Prices in Six Years

Further reductions in the copper market bring the producers' prices down to 13 cents a pound, delivered, for first quarter, outside market prices to 12.50 cents and certain small producers' to 12.75 cents. At the same time there have been both good sales made at these prices and increased inquiries.

The latest development, however, is the possibility that large copper producers will withhold heavy tonnages from the market in an endeavor to keep the market from going to still lower levels. The price now is said to be lower than that at which most companies can produce, although at least one producer is known still to be below these prices on his costs. Not since before the war has the metal sold at such low figures as are now ruling.

Easier Prices of Pole Line Hardware

Following the decline in steel prices during the past month, manufacturers of pole line hardware have been gradually lowering their quotations to conform to reduced raw material costs. Furthermore, slackening demand and the overcoming of prevailing long deliveries as winter approached have aided to ease the price situation. One of the leading manufacturers reduced the price of pole line hardware between 10 and 15 per cent the first of December. Another manufacturer followed suit with a drop in price of 15 per cent the middle of the month. A third has just recently announced a price decrease amounting to about 5 per cent.

Back orders have just about been caught up with now, although surplus stocks have not accumulated in any great volume. Some items are occasionally shipped from stock and delivery of the remainder ranges up to 2 or 3 weeks.

Sixteen Cars Destroyed by Fire in St. Louis

A fire which started at 7.25 p.m. on Jan. 3 in the Debaliviere carhouse of the United Railways, St. Louis, Mo., destroyed sixteen cars, damaged seventeen more cars and four trailers and left one section of the building in ruins. The damage is estimated by Receiver Rolla Wells to be $200,000 to the equipment, and $50,000 to the building. The loss is partially covered by insurance. All cars of five lines of the United Railways are housed at the Debaliviere carhouse when not in service. About 100 cars and trailers were in the carhouse and yards when the fire started. Of the cars damaged, seven motor cars and four trailers were seriously impaired and ten cars were slightly damaged.

By drafting cars from other carhouses and from the repair shops the schedules on all lines were maintained the following day. Colonel A. T. Perkins, general manager for the receiver, said the loss would not seriously affect the service although it largely offset the gain of thirty-seven cars recently put into service as part of fifty authorized by the public service commission. To replace the cars that were destroyed will entail considerable expense as many of them were of older types and cost less than half the present selling price of modern type cars.

Origin of the fire was undetermined on Jan. 4, but it was thought the conflagration started in a car standing in the center of the southeast corner of the carhouse.

Rolling Stock

Galesburg (Ill.) Railway, Lighting & Power Company has received ten new safety cars for service on its lines.

Brantford Municipal Railway, Brantford, Ont., Canada, has purchased and put into operation two one-man cars formerly operated on a Connecticut railway which went into insolvency.

W. S. Twining, City Transit Director, Philadelphia, Pa., has called for bids

NEW YORK METAL MARKET PRICES

	Dec. 1, 1920	Jan. 5, 1921
Copper ingots, cents per lb	14.00	12.75 to 13.00
Copper wire base, cents per lb	17.00	16.25
Lead, cents per lb	5.50	4.75
Nickel, cents per lb	43.00	43.00
Zinc, cents per lb	6.00	6.00
Tin, cents per lb	33.25	36.75
Aluminum, 98 to 99 per cent, cents per lb	32.90	28.30

OLD METAL PRICES—NEW YORK

	Dec. 1, 1920	Jan. 5, 1921
Heavy copper, cents per lb	10.50 to 11.00	10.00 to 10.50
Light copper, cents per lb	8.50 to 9.00	8.00 to 8.25
Heavy brass, cents per lb	6.50 to 7.00	6.00 to 6.50
Zinc, old scrap, cents per lb	3.25 to 3.50	3.00 to 3.25
Yellow brass, cents per lb	4.50 to 5.00	4.00 to 4.50
Lead, heavy, cents per lb	4.00 to 4.50	3.50 to 3.75
Steel car axles, Chicago, pet net ton	20.00 to 21.00	17.00 to 18.00
Old car wheels, Chicago, per gross ton	32.00 to 33.00	21.00 to 22.00
Steel rails (short) Chicago, per gross ton	19.00 to 20.00	16.50 to 17.00
Steel rails (rerolling), Chicago, gross ton	20.00 to 21.00	17.00 to 18.00
Machine shop turnings, Chicago, net ton	7.50 to 8.00	6.00 to 6.50

ELECTRIC RAILWAY MATERIAL PRICES

	Dec. 1, 1920	Jan. 5, 1921
Rubber-covered wire base, New York, cents per lb	23.00	18.00
Weatherproof wire base, New York, cents per lb	22.00	19.00 to 20.00
Standard Bessemer Steel Rails, per gross ton	45.00 to 55.00	45.00 to 51.00
Standard open hearth rails, per gross ton	47.00 to 57.00	47.00 to 53.00
T-rail, high (Shanghai), per gross ton, f.o.b. mill	73.00	73.00
Rails, girder (grooved), per gross ton, f.o.b. mill	88.00	88.00
Wire nails, Pittsburgh, cents per lb	3.25 to 4.25	3.25
Railroad spikes, drive, Pittsburgh base, cents per lb	3.25 to 4.25	3.65 to 4.00
Tie plates (flat type), cents per lb	3.00 to 3.75	2.75
Tie plates (brace type), cents per lb	3.00 to 3.75	2.75
Tie rods, Pittsburgh base, cents per lb	6.00 to 6.50	6.00
Fish plates, cents per lb	3.25 to 4.25	2.75
Angle bars, cents per lb	3.25 to 4.25	2.75
Rail bolts and nuts, Pittsburgh base, cents per lb	6.00 to 7.00	5.50
Steel bars, Pittsburgh, cents per lb	2.35 to 3.00	2.35
Sheet iron, black (24 gage), Pittsburgh, cents per lb	4.20 to 5.35	4.20
Sheet iron, galvanized (24 gage), Pittsburgh, cents per lb	5.25 to 6.55	5.25
Galvanised barbed wire, Pittsburgh, cents per lb	4.10 to 4.85	4.10
Galvanized wire, ordinary, Pittsburgh, cents per lb	3.95 to 4.45	3.95
Car window glass (single strength), first three brackets, A quality, New York, discount*	77%	77%
Car window glass (single strength), first three brackets, B quality, New York, discount	77%	77%
Car window glass (double strength, all sizes, A quality), New York, discount	79%	79%
Waste, wool (according to grade), cents per lb	15 to 21	13 to 19
Waste cotton (100 lb. bale), cents per lb	15 to 17½	11 to 15
Asphalt, hot (150 tons minimum), per ton delivered	40.00	40.00
Asphalt, cold (150 tons minimum, pkgs. weighed in), per ton	36.00	36.00
Asphalt, filler, per ton	36.00	36.00
Cement, New York, per bbl	4.90	4.50
Linseed oil (raw, 5 bbl. lots), New York, per gal	.85	.83
Linseed oil (boiled, 5 bbl. lots), New York, per gal	.87	.85
White lead (100 lb. keg), New York, cents per lb	14.25	14.00
Turpentine (bbl. lots), New York, per gal	.95	.75

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* These prices are f.o.b. works, with boxing charges extra.

on 100 steel passenger cars for the Frankford Elevated Railway, which, it is expected, will be operated under lease by the Philadelphia Rapid Transit Company. Bids will be opened on Jan. 25.

The City of New York has ordered forty-three more safety cars from the J. G. Brill Company. This order follows one placed with the same company about the middle of October for twenty-eight safety cars, at a cost of $7,050 each, on behalf of the Staten Island Midland Railway, which resumed operation under the city on Dec. 1. The new cars will be apportioned on the Staten Island and Williamsburg Bridge lines.

The Detroit (Mich.) Municipal Railway has received the first of the 25 safety cars ordered by the Detroit street railway commission for use on the new municipal lines. The remaining cars are expected to arrive at the rate of two each day. The cars will be stored temporarily at the upper end of Montclair Ave., until the first car barn is completed. Plans for the latter are under way but actual construction has not started. The Peter Witt type of double-truck car for use on the heavy traffic streets has been discussed and it is probable that an order for one of these cars will be placed shortly. A car of the Peter Witt type capable of carrying 56 passengers is on exhibition in Cadillac Square.

Track and Roadway

Columbus, Delaware & Marion Electric Company, Columbus, Ohio.—Upon the application of the Columbus, Delaware & Marion Electric Company, Judge E. B. Kinkead of the local courts has granted a temporary restraining order against the Ohio Highway Commission from proceeding with the improvement of North High Street, a distance of about two miles. The complainant alleged that the estimate on the improvement is $380,490, which is excessive and that its share of the improvement will cost $127,000. It is further alleged that this is the wrong time for the award of the contract. It is also claimed that under its franchise the traction company has the right to remove its tracks to the center of the street within a reasonable time and that the state highway commission, by letting the road contract is endeavoring to rush the company in this work.

Power Houses, Shops and Buildings

Monongahela Valley Traction Company, Morgantown, W. Va.—The Monongahela Valley Traction Company has ordered 25 miles of steel towers from the Blaw-Knox Company. The shop work is now under way on these towers.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.—The first generating unit of the Lakeside plant of the Milwaukee Electric Railway & Light Company is in service. This new plant, the ultimate capacity of which is 200,000 kw., will give the Milwaukee district ample electric power supply.

Bamberger Electric Railroad, Salt Lake City, Utah.—Since the necessary steps have been taken to give Kaysville a depot on the Bamberger Electric Railroad the Public Utilities Commission of Utah has dismissed the petition of that city for an order directing the railroad company to construct the depot.

Jamestown (N. Y.) Street Railway.—The office building and part of the West Third Street carhouse of the Jamestown Street Railway was destroyed by fire on Dec. 26. A. N. Broadhead, president of the company, estimated the loss at $50,000. The structure was a frame building erected in 1886. All of the company's tickets and records were in steel vaults and were saved.

Trade Notes

The Brenner Manufacturing Company, 19 Gray Avenue, Utica, N. Y., manufacturer of air compressors, etc., has filed notice of increase of capital stock from $250,000 to $500,000.

The Tubular Woven Fabric Company, Pawtucket, R. I., will open a Pittsburgh office in charge of Gray Jones, formerly of the Cutler-Hammer Company. This is effective Jan. 1, 1921.

The American Insulating Machinery Company, Fairhill and Huntingdon Streets, Philadelphia, has filed notice of increase in capital stock from $50,000 to $200,000.

Electric Plant at Evans Bay, New Zealand.—The City Council of Wellington, New Zealand, contemplates a number of improvements, among which are the erection of an electric power station, tramway extensions, new car sheds and cars, to cost about £664,887.

The John E. Thropp's Sons, Lewis Street, Trenton, N. J., has acquired property in the vicinity of Fair Street for future extensions. The company manufacturers mechanical stokers, etc.

The Louisville Electrical Manufacturing Company, 660 South Second Street, Louisville, Ky., is planning to erect a new plant, 60 ft. x 150 ft., for the manufacture of portable electric tools.

The Automatic Reclosing Circuit Breaker Company, Columbus, Ohio, announces the appointment of the W. D. Hammer Company, 508 Traction Terminal Building, Indianapolis, Ind., as its representative in the State of Indiana and western Kentucky.

The American Blower Company, 141 Broadway, New York City, manufacturer of mechanical draft equipment, fans, motors, etc., has increased its capital stock from $1,500,000 to $3,750,000. The company has plants at Green Island, N. Y., and Detroit, Mich.

The Line Material Company, South Milwaukee, Wis., through Vice-President L. E. Hendee, announces that the recent fire which wiped out the office did not halt the company's operations. All vital records were found intact in the safes, while the operating plant was undamaged.

The Power Plant Engineering Company, Seattle, Wash., has been incorporated and offices have been established in the L. C. Smith Building. The company is composed of engineers experienced in power-plant installation and operation, and it is in a position to contract for, design and install all power equipment. It also has the exclusive agency for the Santmyer powdered coal equipment. W. J. Santmyer is president, R. S. Whaley is vice-president, and A. E. MacInnis is secretary-treasurer.

Garnet Blocksidge, railway department, Philadelphia office of the Westinghouse Electric & Manufacturing Company, has resigned to become sales engineer, London office of the Westinghouse International Company. After graduating from the Virginia Polytechnic Institute in 1906, Mr. Blocksidge joined the Westinghouse Electric & Manufacturing Company as a graduate student, and remained at East Pittsburgh until 1912, when he was transferred to the Baltimore office as salesman in the railway and light department.

The Black & Decker Manufacturing Company, Towson Heights, Md., has established a new branch office at 303 Penn Avenue, Pittsburgh, Pa., in charge of W. D. Royer, formerly sales engineer of the Robbins Electric Company, Pittsburgh. This office will be the headquarters for the Black & Decker sales force in western New York, western Pennsylvania and the northwestern part of West Virginia. A service station has also been established at the same address.

New Advertising Literature

Car Seats.—The J. G. Brill Company, Philadelphia, Pa., has issued bulletin No. 247, describing and illustrating "Brill Non-Reversible Seats."

Welding.—Metal & Thermit Corporation, 120 Broadway, New York City, has issued pamphlet No. 39, an illustrated booklet on "Thermit Insert Rail Weld."

Fire Extinguisher.—Foamite Firefoam Company, 200 Fifth Avenue, New York City, has issued a pamphlet describing its new "All Weather," Model A, 2½-gal., non-freezing fire extinguisher.

Water Heaters. — Ross Heater & Manufacturing Company, Inc., Buffalo, N. Y., manufacturer of heaters for boiler feed, etc., has issued catalog F, a thirty-nine-page booklet illustrating and describing various types of heaters, condensers, expansion joints, coolers and airjector pumps.

The Happy New Year Will Be of Good Cheer If You Brake with Peacocks You Need Never Fear

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"Have we included everything absolutely essential and cut out more items we can get later?"

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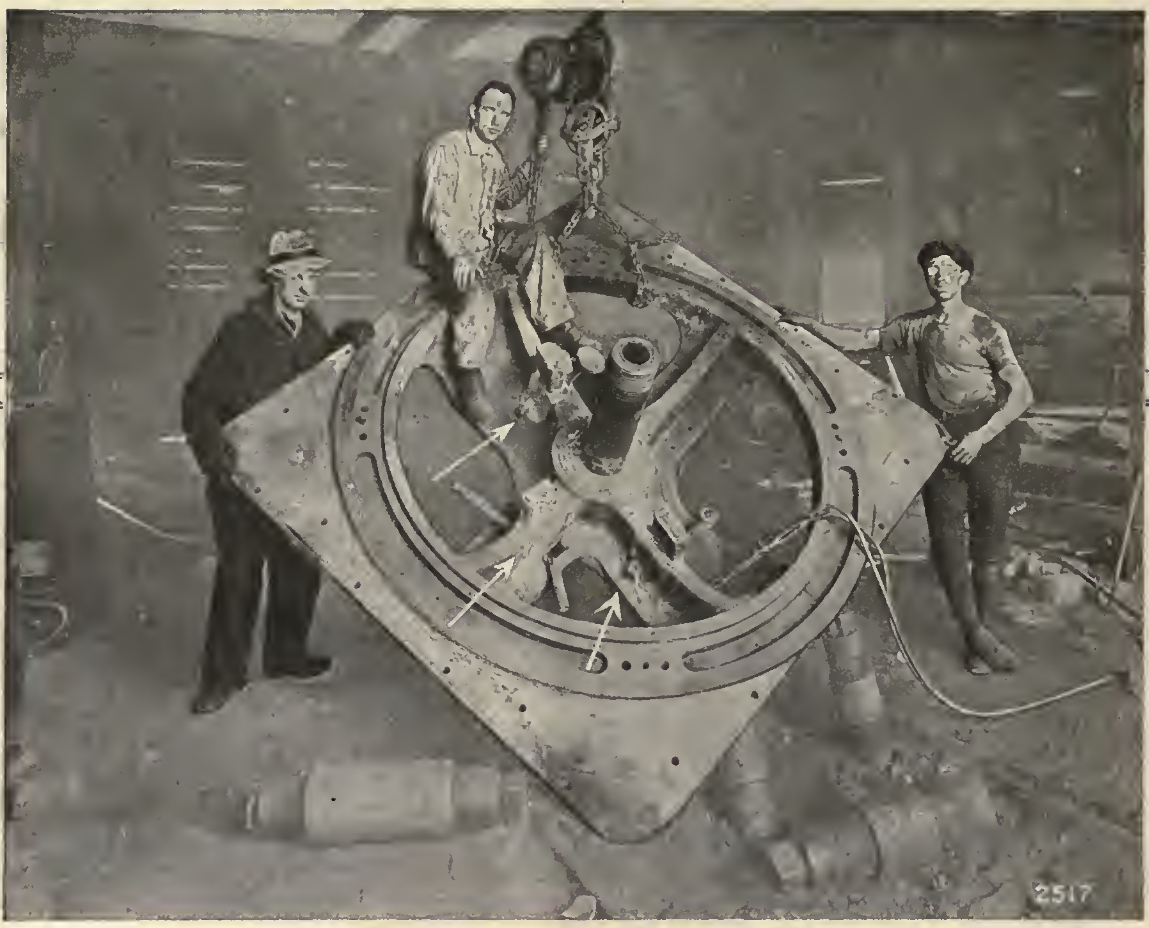

THE illustration shows a cast iron turntable base of an electric locomotive crane which was recently repaired by The New England Welding Company, Worcester, Mass., for the Boston (Mass.) Elevated Railway, by means of

Thermit Welding

The crane base was broken in three places, the average dimension of each break being 6 in. x 9 in. with a 6-in. opening. This exceedingly large opening had been made by another company with the intention of making an oxy-acetylene weld, which had not proved successful. About 660 lbs. of Thermit steel were used in making the three welds. This repair saved the Boston Elevated Railway many weeks' loss of the use of its locomotive crane.

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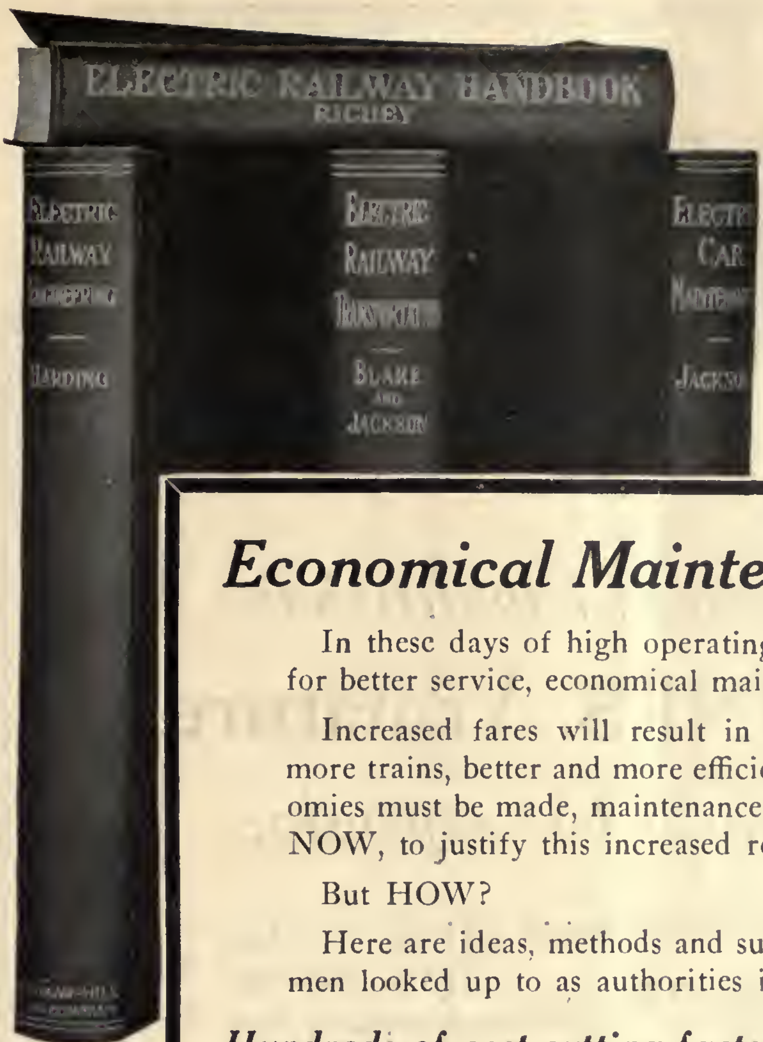

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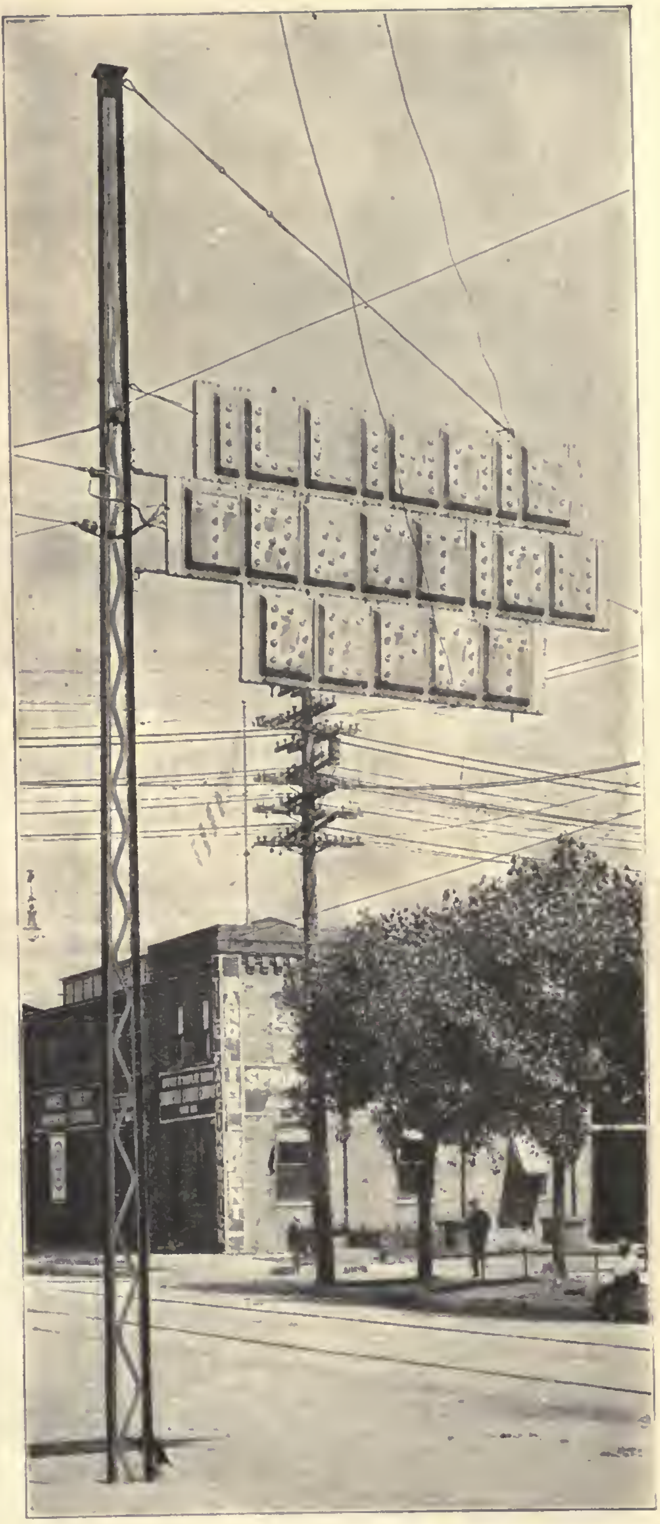

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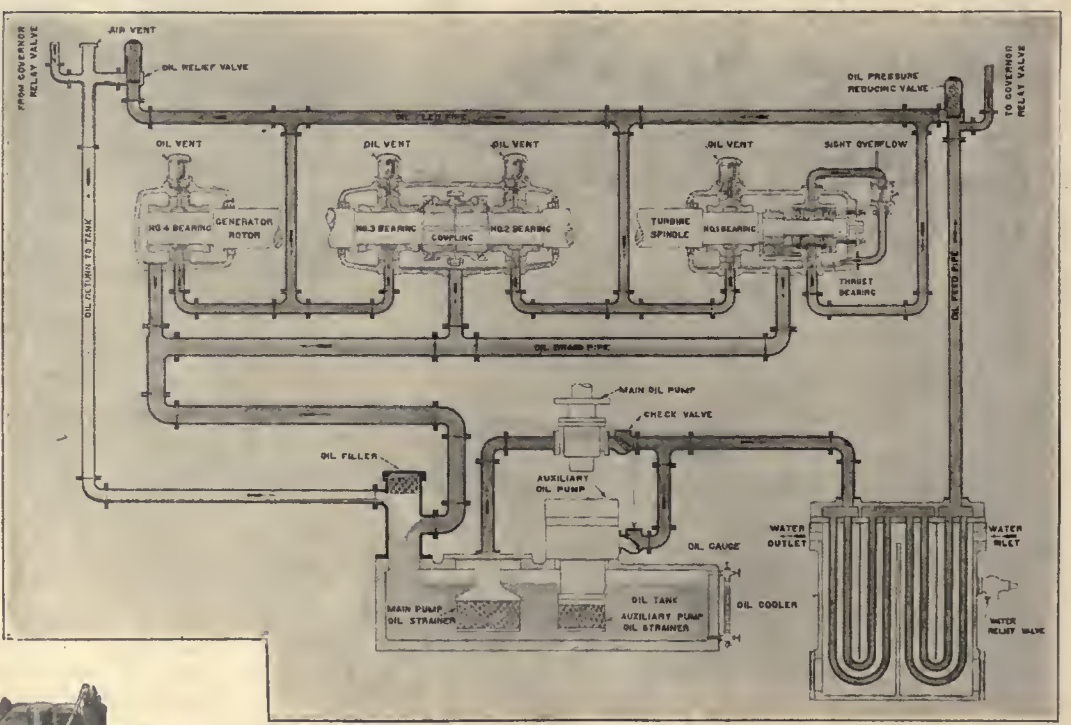

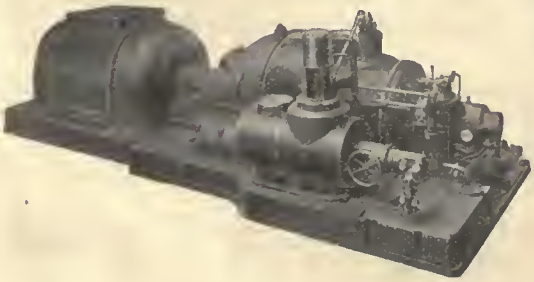

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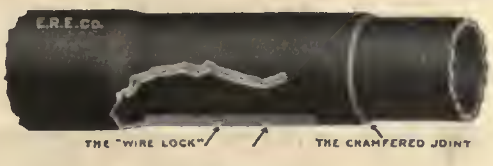

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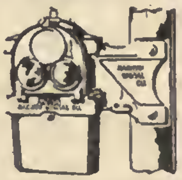

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See our double-page advertisement in last week's and next week's issues and send for booklets. "Lackawanna Deseamed Rails." "Improved Track Appliances," and "Track Bolts and Spikes."

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Sole Exporter of Our Commercial Products, Consolidated Steel Corp., New York
General Sales Office and Works: Lackawanna, N. Y.
Boston Chicago Cleveland New York St. Louis
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(formerly Whiting Foundry Equipment Co.)
General Offices and Works: Harvey, Ill.
CRANES OF ALL TYPES
FOUNDRIES EQUIPPED COMPLETE

Peirce Forged Steel Pins with Drawn Separable Thimbles
Your best insurance against insulator breakage
Hubbard & Company
PITTSBURGH, PA.

Transmission Line and Special Crossing Structures, Catenary Bridges
WRITE FOR OUR NEW DESCRIPTIVE CATALOG.
ARCHBOLD-BRADY CO.
Engineers & Contractors SYRACUSE, N. Y.

HIGH-GRADE TRACK WORK
SWITCHES—MATES—FROGS—CROSSINGS
COMPLETE LAYOUTS
IMPROVED ANTI-KICK BIG-HEEL SWITCHES
HARD CENTER AND MANGANESE CONSTRUCTION

New York Switch & Crossing Co.
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BARBOUR-STOCKWELL CO.
205 Broadway, Cambridgeport, Mass.
Established 1858

Manufacturers of
Special Work for Street Railways
Frogs, Crossings, Switches and Mates
Turnouts and Cross Connections
Kerwin Portable Crossovers
Balkwill Articulated Cast Manganese Crossings

ESTIMATES PROMPTLY FURNISHED

AETNA INSULATION LINE MATERIAL
Third Rail Insulators, Trolley Bases, Harps and Wheels, Bronze and Malleable Iron Frogs, Crossings, Section Insulators, Section Switches.
Albert & J. M. Anderson Mfg. Co.
289-93 A Street, Boston, Mass.
Established 1877
Branches—New York, 135 B'way, Philadelphia, 429 Real Estate Trust Bldg. Chicago, 105 So. Dearborn St.
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Better High Tension Insulators
Advice, Estimates and Engineering Service on request
Jeffery-Dewitt Insulator Co.
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BENNETT-FIELD CROSS TIE CO.
FISHER BLDG., CHICAGO
"The Shippin' Fools"
RAILROAD TIES, SWITCH TIES and CROSSING PLANK

A Single Segment or a Complete Commutator
is turned out with equal care in our shops. The orders we fill differ only in magnitude; small orders command our utmost care and skill just as do large orders. CAMERON quality applies to every coil or segment that we can make, as well as to every commutator we build. That's why so many electric railway men rely absolutely on our name.
Cameron Electrical Mfg. Co., Ansonia, Connecticut

Dependable Track Work for Electric Railways

Frogs, Switches, Switch Stands, Crossings, Special Track Work, Machine and Drop Forgings, Pressed Steel and Hammer Work. Foundry for Manganese Steel Castings and special facilities for heat treating. Let us bid on your requirements.

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Send for new Rail Bond book

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TRACK SPECIAL WORK

WE MAKE THIS GRADE ONLY

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CLEVELAND, OHIO

IN 1898

STEAM SUPERHEATERS

Were introduced commercially in the United States by this Company. Owners of boilers it has built—Babcock & Wilcox, Stirling and Rust—not now equipped with these coal-saving accessories can obtain information about superheating possibilities from the nearest office listed below.

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CINCINNATI, Traction Bldg.
ATLANTA, Candler Bldg.
TUCSON, ARIZ., 21 So. Stone Avenue
NEW ORLEANS, 533 Baronne Street
DENVER, 435 Seventeenth Street
SALT LAKE CITY, 705-6 Kearns Bldg.
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LOS ANGELES, 404-406 Central Bldg.
SEATTLE, L. C. Smith Bldg.
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WATER PURIFICATION SYSTEMS SOFTENING & FILTRATION FOR BOILER FEED AND ALL INDUSTRIAL USES

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FOSTER SUPERHEATERS

A necessity for turbine protection, engine cylinder economy and utilization of superheat for all its benefits

Power Specialty Company Boston Chicago Philadelphia San Francisco Pittsburgh London, Eng. 111 Broadway, New York

Where strength and dependability are requisites specify
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At your dealer's.

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"The Wrench People"
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BUFFALO 143 Vulcan St.
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ST. CATHARINES, ONT.

WE CAN CUT YOUR COST OF HEATING CURRENT
Write for THERMOSTATIC CONTROL INFORMATION

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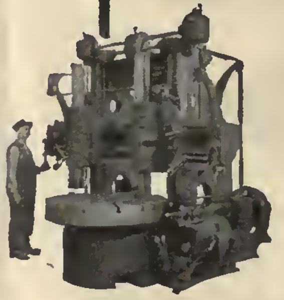
ELECTRIC HEATERS Cut Installation and Maintenance Charge.
VENTILATORS Also Ventilate in Stormy Weather.
THERMOSTATS Save Current.
ORIGINATED the use of NON-CORROSIVE Wire for Electric Car Heaters.
ORIGINATED The Ventilated Coil Support.

LET US FIGURE ON YOUR NEXT REQUIREMENTS
Gold Car Heating & Lighting Co., 17 Battery Pl., New York



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A Chain Hoist that excels in every feature. It has Planetary Gears, Steel Parts, 3½ to 1 factor of Safety. It's the only Block that carries a five-year guarantee.
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THOUSANDS IN USE
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DOES THE WORK OF FROM 6 TO 12 MEN
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THE TERRY TURBINE
For Driving Your Auxiliaries
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Use them in your terminals—
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Faster than the ticket seller
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high-grade R. R. Track and Car Jacks.
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The Cleveland is a locked box—in reality a Safe. It receives all fares (cash or tickets) and carries them direct to your counting room under lock and key.

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The Cleveland Fare Box Company
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Standard equipment of largest Traction Companies

There is a combination for your requirements

Consider the time lost when making change for passengers. Eliminate unnecessary delays. Supply High Speed Money Changers to your conductors. Prices and literature on request.

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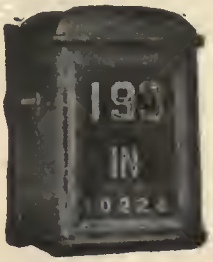

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Type R-10
Single Register

International Fare Registers. Single registers, round and square; double registers, duplex counters, car fittings, foot-operating devices for single and double registers. Exclusive selling agents for Heeren enamel cap and coat badges.

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Eliminate Accidents

Send for Catalogue No. 18

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Trade Mark Reg. U. S. Pat. Off.
Made of extra quality stock firmly braided and smoothly finished.
Carefully inspected and guaranteed free from flaws.
Samples and information gladly sent.

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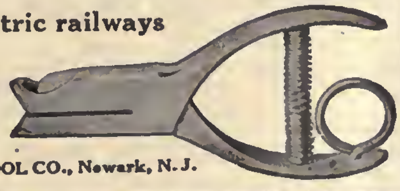

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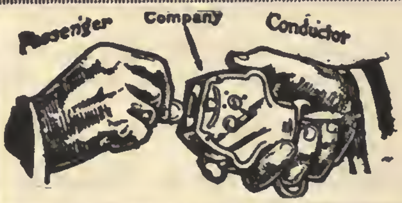

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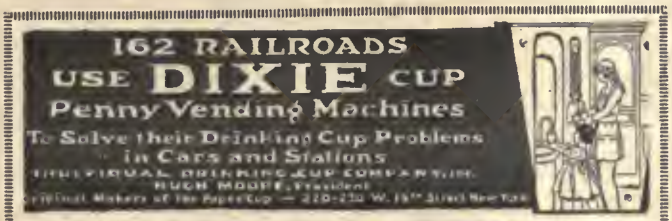

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To Solve their Drinking Cup Problems in Cars and Stations
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Let us demonstrate to you how we can heat and ventilate your cars at the lowest possible cost

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H-B LIFE GUARDS

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General Sales Agents

Electric car heaters—thermostatic control—pneumatic car door operators—buzzers, single-stroke bells, starting signal lights—special resistances.

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POSITIONS VACANT

EXPERIENCED timetable man wanted to analyze traffic and make schedules for short headway, multi-terminal Eastern road. State in first letter age, family, ducation, experience and salary wanted. P-824, Elec. Ry. Journ.

MASTER mechanic wanted for Middle West on a division operating 40 interurbans on 600-1,200 volts. P-787, Elec. Railway Journal, Leader-News Bldg., Chicago.

SUPERINTENDENT wanted for operation of interurban line; location, Central West. P-822, Elec. Ry. Journal, Old Colony Bldg., Chicago.

POSITIONS WANTED

CONSTRUCTION superintendent high-tension transmission, catenary or cross-country interurban; extensive experience. Can apply machinery and give low cost; age 48. PW-813, Elec. Ry. Journal, Real Estate Trust Bldg., Philadelphia.

ENGINEER executive desires change; technical graduate, age 39; 18 years' public utility experience, all branches. Can secure co-operation of employees and deal successfully with public PW-821, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

FOREMAN, experienced in overhauling and maintenance of rolling stock, motors, etc. Handle men to advantage; best reference. PW-816, Elec. Ry. Journal, Real Estate Trust Bldg., Philadelphia.

POSITION wanted by experienced armature winder, car wireman, general repair man, shop foreman and master mechanic would like to locate in Central States either as master mechanic shop foreman or department foreman. Can get results from men and equipment; first-class reference.. State your full proposition in first letter. PW-825, Elec. Ry. Journal, Real Estate Trust Bldg., Philadelphia.

YOUNG man, single; now employed, desires to make change; 14 years' experience in transportation department of large Eastern railway; capable of supervising car house or system; make own schedules for short haul or interurban service. PW-818, Elec. Ry. Journal.

SUPERINTENDENT of transportation desires a change, age 41, clean, capable, progressive, possssing a full knowledge of transportation details, having 18 years' experience dealing with public and labor; fully capable of taking over details of any city or suburban property and getting results. Will consider any proposition that requires hard work and extra effort to get results; best of references as to character and abilty. Address, giving details. PW-823, Elec. Ry. Journ., Old Colony Bldg., Chicago.

OFFICIAL PROPOSALS

Bids: Jan. 25.

Steel Passenger Car Bodies and Trucks

DEPARTMENT OF CITY TRANSIT
CITY OF PHILADELPHIA
12th Floor, 1211 Chestnut Street
Philadelphia, Pa.

Sealed proposals, addressed to the undersigned at the office above mentioned, will be received until 12 o'clock noon, on Tuesday, January 25, 1921, and opened immediately thereafter for the following work appurtenant to the Frankford Elevated Railway, authorized by Ordinance of Councils approved July 20, 1916, and June 29, 1920.

For furnishing not less than 50 nor more than 100 Steel Passenger Car Bodies, and Mounting Equipment, grouped in Contract supplied by the City, Contract 600.

For furnishing not less than 54 nor more than 104 Motor Trucks, and not less than 52 nor more than '102 Trailer Trucks for Steel Passenger Cars, Contract 601.

Or—for furnishing both the Car Bodies and the Trucks described above, and Mounting Equipment, grouped in Contract 602.

Plans and specifications can be seen at 12th floor, 1211 Chestnut Street, and copies of same with blank forms for proposals will be supplied to intending bidders upon application. A deposit of ten (10) dollars will be required for the plans. This deposit will be refunded on the return of the plans.

Contractors will be required to comply with the Act of Assembly of July 18, 1917, relative to Workmen's Compensation Insurance, and proof must be furnished the Department by each Contractor that he has accepted the provisions of said Act and insured his liability thereunder, or secured exemption therefrom.

For each bid a proposal bond in the sum of Five Hundred (500) Dollars must be filed in the Law Department, Room 464, City Hall, in accordance with the ordinance of May 25, 1860, the certificate of such filing to be inclosed with the bid.

The Director reserves the right to reject any or all bids as he may deem best for the interest of the City of Philadelphia.

WILLIAM S. TWINING,
Director.

December 28, 1920.

Due to Change in Equipment We Offer for Sale the Following New Material in Good Condition

75—W. H. 56 Straight Bore Case Hardened Tool Steel Pinions, 15 teeth 3-in. Bore, Taper Bore 1,219 in. per foot.
150—Lorain 27-G Taper Bore Pinion, 17 Teeth, Large Bore 2⅝-in., Taper Bore 1.091-in.
4200 lbs. No. 3 B & S Gauge Magnet Wire D. C. C.
7000 lbs. No. 6 B & S Gauge Magnet Wire D. C. C.
900 lbs. No. 17 B & S Gauge Magnet Wire D. C. C.
250 Rolls ⅝-in. Aluminum Ribbon.
25—G. E. 800 Commutators (Assembled Segments).
63 lbs. Hope No. 1 White Sleeving.
50 Pinions for Air Compressors A A 1.
10 Gears for Air Compressors A A 1.
1—Motor-Driven Ticket Destroying Machine.

PHILADELPHIA RAPID TRANSIT COMPANY
Purchasing Department — 820 Dauphin Street, Philadelphia

COMPLETE POWER PLANT

FOR SALE

1—500 h.p. Westinghouse Compound Engine, Direct Connected to 550 volt Generator.
2—200 h.p. Harrisburg Engines, Belt Connected to Westinghouse Generators.
1—B & W Boiler, 2 Keeler Boilers, Water Heaters, Pumps, Piping, Switchboards and etc.

All in first class operating condition. Immediate delivery. Make us an offer.

The Lewistown & Reedsville Electric Railway Co., Lewistown, Pa.

Machinery in Stock for *Immediate Shipment*

ROTARY CONVERTERS

1—300 kw., Westinghouse, 3-phase, 60-cycle, 600-r.p.m., 600 volts, D.C. 370 volts, A.C.
1—200 kw., Westinghouse, 3-phase, 60-cycle, 720-r.p.m., 575 volts, D.C., 370 volts, A.C.
1—150 kw., Westinghouse, 3-phase, 60-cycle, 720-r.p.m., 250 volts, D.C. 185 volts, A.C.

Also a stock of 25 and 60 cycle TRANSFORMERS in all sizes and voltages

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114-118 Liberty Street, New York City
Telephone 4337-4338 Rector

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Garton Daniels 350-750 V. Lightning Arresters.
No. 9 Hemingray Pony Glass Insulators.
Bronze Trolley Frogs.
Flexible Pole Brackets.
Westinghouse Type A Lightning Arrester.
Watt Hour Meters.
110 V., D. C. Bonding Car.
And many other items.

ZELNICKER IN ST. LOUIS

There are many other bargains in our Bulletin No. 285. Send for a copy.

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New and Relaying Rail

FITTINGS AND TOOLS

TRACK SPECIALTIES CO.
29 Broadway, New York City.

Immediate Shipment

GIRDER RAIL

300 tons 7 in. girder rail, located Amityville, New York, also 1000 tons 70 lb. rail, 2000 tons 90 lb. rail. Write or wire for prices quoted.

M. K. FRANK, Pittsburgh, Pa.

NEW—80-LB. RAIL and ACCESSORIES

Angle Bars, Spikes, Bolts and Nuts Complete

FOR SALE

A.R.A. "TYPE B" RAIL

Approximately 30,000 gross tons—standard lengths

Stored at Kearney, New Jersey

We buy electric and steam railways that are to be dismantled

HYMAN-MICHAELS COMPANY

NEW AND RELAYING RAILS

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New York Office:
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Pittsburgh Office:
1312 First National Bank Bldg.

St. Louis Office:
2115 Railway Exchange Bldg.

FOR SALE

Two 300-H.P. 500 Volt MILL MOTORS

Two Westinghouse 300-h.p. 345 to 500 r.p.m., 500 volt, D.C., compound wound motors, with one spare armature, including two Cutler-Hammer, 300-h.p., 500 volt, D.C. Starters.

Condition good. Ready for inspection. Reason for selling, voltage changed. Write

H. LLEWELLYN, General Purchasing Agent
PITTSBURGH STEEL PRODUCTS CO.
Union Arcade Bldg., Pittsburgh, Pa.

FOR SALE

1—25 ton, electric

Traveling Crane

or hoist symbol made by Niles-Bement-Pond Co.; center to center of runway rails, 78 ft. 4 in.; approximate vertical travel of hook, 24 ft.

United Electric Light Co.
Springfield, Mass.

FOR SALE

16 West. 56 Motors. 4 K-14 Controllers. 4 National type BB-4 Air Brake Equipments complete. 15 Double Truck Cars, 40-ft. long, mounted on Brill Trucks equipped with 4 GE-67 Motors, 2 K-6 Controllers, Air Brakes, etc., complete.

Electric Equipment Co.
Commonwealth Building, Philadelphia, Pa.

NEW
REBUILT

ELECTRIC MOTORS

REWINDING
REPAIRING

NEW A.C. MOTORS ¼ to 15 H.P.—LARGE STOCK USED MOTORS
EXCELLENT REPAIR SERVICE ON ANY SIZE OR TYPE

CLEVELAND ARMATURE WORKS, INC.

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New—Used—Rebuilt

MACHINERY AND SUPPLIES

for construction and industrial work

READING ENGINEERING CO., INC.
154 Nassau St., New York

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Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Acetylene Service & Apparatus
Oxweld Acetylene Co.

Advertising, Street Car
Collier, Inc., Barron G.

Air Aftercoolers
Ingersoll-Rand Co.

Air Receivers
Ingersoll-Rand Co.

Anchors, Guy
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Angle Bars
Lackawanna Steel Co.

Automobiles and Buses
Brill Co., The J. G.

Axles
Bemis Car Truck Co.
St. Louis Car Co.

Axle Straighteners
Columbia M. W. & M. I. Co.

Axles, Car Wheel
Bemis Car Truck Co.
Brill Co., The J. G.
Standard Steel Works Co.
Westinghouse Elec. & Mfg. Co.

Babbitt Metal
Ajax Metal Co.
More-Jones Brass & Metal Co.

Babbitting Devices
Columbia M. W. & M. I. Co.

Badges and Buttons
Electric Service Supplies Co.
International Register Co., The

Batteries, Storage
Electric Storage Battery Co.

Bearings and Bearing Metals
Ajax Metal Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
General Electric Co.
More-Jones Brass & Metal Co.
St. Louis Car Co.
Westinghouse Elec. & Mfg. Co.

Bearings, Center and Roller Side
Stucki Co., A.

Bells and Gongs
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
St. Louis Car Co.

Benders, Rail
Niles-Bement-Pond Co.

Boilers
Babcock & Wilcox Co.

Boiler Tubes
National Tube Co.

Bond Testers
American Steel & Wire Co.

Bonding Apparatus
American Steel & Wire Co.
Electric Service Supplies Co.
Ohio Brass Co.
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Bonds, Rail
American Steel & Wire Co.
Copper Clad Steel Co.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Book Publishers
McGraw-Hill Book Co., Inc.

Boring Tools, Car Wheel
Niles-Bement-Pond Co.

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American Bridge Co.
Bates Expanded Steel Truss Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Hubbard & Co.
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Westinghouse Traction Brake Co.

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Amer. Brake Shoe & Fdry. Co.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

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Allis-Chalmers Mfg. Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
National Brake Co.
Safety Car Devices Co.
St. Louis Car Co.
Westinghouse Traction Brake Co.

Bridges and Buildings
American Bridge Co.

Brooms, Track, Steel or Rattan
Zelnicker, W. A., Supply Co., Inc.

Brushes, Carbon
Corliss Carbon Co.
General Electric Co.
Jeandron, W. J.
Morganite Brush Co., Inc.
United States Graphite Co.
Westinghouse Elec. & Mfg. Co.

Brush Holders
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.

Bunkers, Coal
American Bridge Co.

Bushings, Case Hardened and Manganese
Bemis Car Truck Co.

Bushings, Graphite and Wooden
Bound Brook Gillese Bearing Co.

Cables (See Wires and Cables)

Carbon Brushes (See Brushes, Carbon)

Car Panel Safety Switches
Westinghouse Elec. & Mfg. Co.

Cars, Dump
Differential Car Co.

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American Car Co.
Brill Co., The J. G.
Kuhlman Car Co., G. C.
McGuire-Cummings Mfg. Co.
National Ry. Appliance Co.
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Wason Mfg. Co.

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Electric Equipment Co.

Cars, Self-Propelled
Electric Storage Battery Co.
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Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.
More-Jones Brass & Metal Co.

Castings, Gray Iron and Steel
American Bridge Co.
American Steel Foundries
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Standard Steel Works Co.
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Castings, Malleable and Brass
Amer. Brake Shoe & Fdry. Co.
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Ackley Brake & Supply Corp.
Electric Service Supplies Co.
Ohio Brass Co.
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Ceiling, Car (See Headlining)

Change Carriers
Galef, J. L.

Circuit Breakers
Automatic Reclosing Circuit Breaker Co.
General Electric Co.
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Clamps and Connectors for Wires and Cables
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Coil Banding and Winding Machines
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Cleveland Armature Works
Columbia M. W. & M. I. Co.
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Coils, Choke and Kicking
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Commutator Slotters
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Commutator Truing Devices
General Electric Co.

Commutators or Parts
Cameron Electrical Mfg. Co.
Cleveland Armature Works
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Compressors, Air
Allis-Chalmers Mfg. Co.
General Electric Co.
Ingersoll-Rand Co.
Westinghouse Trac. Brake Co.

Compressors, Gas
Ingersoll-Rand Co.

Condensers
Allis-Chalmers Mfg. Co.
General Electric Co.
Schutte & Koerting Co.
Westinghouse Elec. & Mfg. Co.

Conduit Fittings
Chicago Fuse Mfg. Co.

Connectors, Solderless
Frankel Connector Co.
Westinghouse Elec. & Mfg Co.

Controller Fingers
Russell Mfg. Co.

Controllers or Parts
Allis-Chalmers Mfg. Co.
Columbia M. W. & M. I. Co.
General Electric Co.
Russell Mfg. Co.
Westinghouse Elec. & Mfg. Co.

Controller Regulators
Elec. Service Supplies Co.

Controlling Systems
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Converters, Rotary
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Conveyors, Belt
Portable Machinery Co

Conveyors, Coal and Ash
Green Eng. Co.
Portable Machinery Co.

Conveyors, Portable
Portable Machinery Co.

Conveying and Hoisting Machinery
Allis-Chalmers Mfg. Co.
American Bridge Co.
Columbia M. W. & M. I. Co.
Portable Machinery Co.

Copper Wire
Anaconda Copper Mining Co.
Copper Clad Steel Co.

Cord, Bell, Trolley, Register, etc.
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Roebling's Sons Co., John A.
Samson Cordage Works

Cord Connectors and Couplers
Electric Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car
Brill Co., The J. G.
Ohio Brass Co.
Westinghouse Trac. Brake Co.

Cranes
Allis-Chalmers Mfg. Co.
Niles-Bement-Pond Co.
Whiting Corp.

Cross Arms (See Brackets)

Crossing Foundations
International Steel Tie Co.

Crossing Signals (See Signals, Crossing)

Crossings, Frog and Switch
Wharton, Jr., & Co., Wm.

Crossings, Track (See Track, Special Work)

Curtains and Curtain Fixtures
Brill Co., The J. G.
Electric Service Supplies Co
St. Louis Car Co.

Cutouts
Chicago Fuse Mfg Co.

Cutting Apparatus, Oxy Acetylene
Oxweld Acetylene Co.

Dealers' Machinery
Archer & Baldwin
Electric Equipment Co.
Foster Co., L. B.
Hyman Michaels Co.

Derailing Devices (See also Track Work)
Cleveland Frog & Crossing Co.
Wharton, Jr., & Co., Wm.

Destination Signs
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

Detective Service
Wish Service, P. Edward

Dogs, Lathe
Williams & Co., J. H.

Door Operating Devices
Consolidated Car Heating Co.
National Pneumatic Co., Inc.
Safety Car Devices Co.

Doors and Door Fixtures
Brill Co., The J. G.
General Electric Co.

Doors, Folding Vestibule
National Pneumatic Co., Inc

Draft Rigging (See Couplers)

Drills, Rock
Ingersoll-Rand Co.

Drills, Track
American Steel & Wire Co.
Electric Service Supplies Co.
Niles-Bement-Pond Co.
Ohio Brass Co.

Drinking Cups, Sanitary Paper
Individual Drinking Cup Co., Inc.

Dryers, Sand
Electric Service Supplies Co.
Zelnicker Supply Co., Inc., Walter A.

Electrical Wires and Cables
American Steel & Wire Co.
Roebling's Sons Co., J. A.

Engineers, Consulting, Contracting and Operating
Allison & Co., J. E.
Archbold-Brady Co.
Arnold Co., The
Clark & Co., Mgr., Corp., E. W.
Day & Zimmermann
Feustel, Robert M.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Englehardt W.
Jacobs & Co., J. L.
Jackson, Walter
Parsons, Klapp, Brinkerhoff & Douglas
Republic Engineers, Inc.
Richey, Albert S.
Sanderson & Porter
Scofield Engineering Co.
Stone & Webster
White Engineering Corp., The J. G.

Engines, Gas, Oil or Steam
Allis-Chalmers Mfg. Co.
Ingersoll-Rand Co.
Westinghouse Elec. & Mfg. Co.

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Brill Co., The J. G.
Cleveland Fare Box Co.
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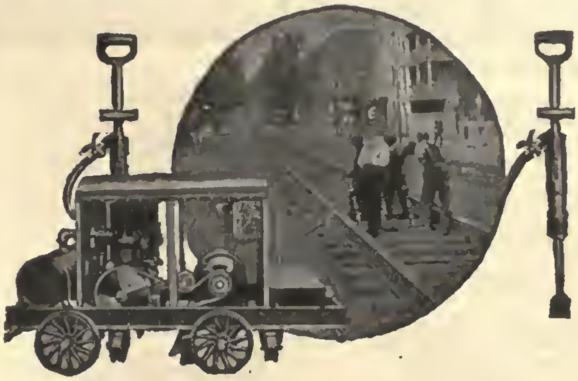

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Electric Service Supplies Co.

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Westinghouse Elec. & Mfg. Co.

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Scaife & Sons Co., Wm. B.

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Electric Service Supplies Co.

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American Mason Safety Tread Co.

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Columbia M. W. & M. I. Co.
Standard Steel Works Co.
Williams & Co., J. H.

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Whiting Corp.

Frogs, Track (See Track Work)

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General Electric Co.
Westinghouse Elec. & Mfg. Co.
Williams & Co., J. H.

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Nuttall Co., R. D.
Star Brass Works

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Gold Car Heating & Lighting Co.
National Ry. Appliance Co.
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Smith Heater Co. Peter

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Smith Heater Co., Peter

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Niles-Bement-Pond Co.

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General Electric Co.
Westinghouse Elec. & Mfg. Co.

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Electric Service Supplies Co.
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Westinghouse Elec. & Mfg. Co.

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Hubbard & Co.

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Buckeye Jack Mfg. Co.
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Westinghouse Elec. & Mfg. Co.

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Electric Railway Equipment Co.
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General Electric Co.
Hubbard & Co.
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Westinghouse Elec. & Mfg. Co.

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McGuire-Cummings Mfg. Co.
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Niles-Bement-Pond Co.

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Columbia M. W. & M. I. Co.

Manganese Steel Castings
Wharton, Jr., & Co., Wm.

Manganese Steel Special Track Work
Wharton, Jr., & Co., Wm.

Meters (See Instruments)
Electric Service Supplies Co.

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Drew Elec. & Mfg. Co.

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Galef, J. L.

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Wood Co., Chas. N.

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General Electric Co.

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Hubbard & Co.
Lackawanna Steel Co.

Oil Burning Equipment
Schutte & Koerting Co.

Oils (See Lubricants)

Oxy-Acetylene (See Cutting Apparatus)

Packing
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Paints & Varnishes (Preservatives)
St. Louis Surfacer & Paint Co.

Paints and Varnishes for Woodwork
National Ry. Appliance Co.

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Northern Gravel & Stove Co.

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Pickups, Trolley Wire
Electric Service Supplies Co.
Ohio Brass Co.

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Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co
Wood Co., Chas. N.

Pinions (See Gears)

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Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse Traction Brake Co.

Pipe
National Tube Co.

Pipe Fittings
Power Specialty Co.
Standard Steel Works Co.
Westinghouse Traction Brake Co.

Planers (See Machine Tools)

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Electric Service Supplies Co.

Pneumatic Tools
Ingersoll-Rand Co.

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Hubbard & Co.

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Bates Expanded Steel Truss Co.
Electric Railway Equipment Co.
Hubbard & Co.

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Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
National Tube Co.
Nuttall Co., R. D.

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Electric Railway Equipment Co.
National Tube Co.

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Duncan Lumber Co.
Page & Hill Co.

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National Ry. Appliance Co.

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Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

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Schutte & Koerting Co.

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Bonney-Vehslage Tool Co.
International Register Co., The
Wood Co., Chas. N.

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Scaife & Sons Co., Wm. B.

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Lackawanna Steel Co.

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Lackawanna Steel Co.

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Rattan
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Electric Service Supplies Co.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.

Registers and Fittings
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Rooke Automatic Register Co.

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American Steel & Wire Co.
Lackawanna Steel Co.

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Electric Service Supplies Co.

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Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

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Electric Service Supplies Co.

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Resistance, Wire and Tube
General Electric Co.
Westinghouse Elec. & Mfg. Co.

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Rheostats
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Sanders, Track
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Ohio Brass Co.
St. Louis Car Co.

Sash Fixtures, Car
Brill Co., The J. G.

Scrapers, Track (See Cleaners and Scrapers, Track)

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St. Louis Car Co.

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The Standard Textile Products Co.

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Cleveland Armature Works
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Zelnicker Supply Co., Inc., Walter A.

Shades, Vestibule
Brill Co., The J. G

Shovels
Allis-Chalmers Mfg. Co.
Brill Co., The J. G
Hubbard & Co.

Signals, Car Starting
Consolidated Car Heating Co.
Electric Service Supplies Co.
National Pneumatic Co., Inc.

Signal Systems, Block
Electric Service Supplies Co.
Nachod Signal Co., Inc.
U. S. Electric Signal Co.
Wood Co., Chas. N.

Signal Systems, Highway Crossing
Nachod Signal Co., Inc.
U. S. Electric Signal Co.

Slack Adjusters (See Brake Adjusters)

Slag
Carnegie Steel Co.

Sleet Wheels and Cutters
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Drew Electric & Mfg. Co.
Electric Railway Equipment Co.
More-Jones Brass & Metal Co.
Nuttall Co., R. D.

Snow-Plows, Sweepers and Brooms
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Consolidated Car Fender Co.
McGuire-Cummings Mfg. Co.

Soldering & Brazing (See Welding Processes & Apparatus

Solderless Connectors
Frankel Connector Co.

Spikes
American Steel & Wire Co
Lackawanna Steel Co.

Splicing Compounds
Westinghouse Elec. & Mfg. Co.

Splicing Sleeves (See Clamps and Connectors)

Spray Nozzles
Schutte & Koerting Co.

Springs, Car and Truck
American Steel Foundries
American Steel & Wire Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Fort Pitt Spring & Mfg. Co.
Standard Steel Works Co.

Sprinklers, Track and Road
Brill Co., The J. G.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.

Steel Castings
Wharton, Jr., & Co., Wm.

Steps, Car
American Mason Safety Tread Co.
Universal Safety Tread Co.

Stokers, Mechanical
Babcock & Wilcox Co.
Westinghouse Elec. & Mfg. Co.

Storage Batteries (See Batteries, Storage)

Strand
Copper Clad Steel Co.
Roebling's Sons Co., J. A.

Structural Steel
Lackawanna Steel Co.

Superheaters
Babcock & Wilcox Co.
Power Specialty Co.

Sweepers, Snow (See Snow Plows, Sweepers and Brooms)

Switch Stands
Ramapo Iron Works

Switches, Track (See Track Special Work)

Switchboxes
Chicago Fuse Mfg. Co.

Switches and Switchboards
Allis-Chalmers Mfg. Co.
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Tampers, Tie
Ingersoll-Rand Co.

Tapes and Cloths (See Insulating Cloth, Paper and Tape)

Telephones and Parts
Electric Service Supplies Co.

Testing, Commercial and Electrical
Elec'l Testing Laboratories

Testing Instruments (See Instruments, Electrical Measuring, Testing, etc.)

Thermostats
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Railway Utility Co.
Smith Heater Co., Peter

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Electric Service Supplies Co.

Tie Plates
Lackawanna Steel Co.

Ties, Mechanical
Dayton Mechanical Tie Co.

Ties and Tie Rods, Steel
American Bridge Co.
Barbour-Stockwell Co.
International Steel Tie Co.

Ties, Wood Cross (See Poles, Ties, Posts, etc.)

Tongue Switches
Wharton, Jr., & Co., Wm.

Tool Holders
Williams & Co., J. H.

Tool Steel
Carnegie Steel Co.

Tools, Thread Cutting
Williams & Co., J. H.

Tools, Track and Miscellaneous
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Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Hubbard & Co.
Railway Track-work Co.

Torches, Acetylene (See Cutting Apparatus)

Towers and Transmission Structures
American Bridge Co.
Archbold-Brady Co.
Bates Expanded Steel Truss Co.
Westinghouse Elec. & Mfg. Co.

Track Bolts and Spikes
Lackawanna Steel Co.

Track Expansion Joints
Wharton, Jr., & Co., Wm.

Track, Special Work
Barbour-Stockwell Co.
Cleveland Frog & Crossing Co
Columbia M. W. & M. I. Co.
Engel & Hevenor
New York Switch & Crossing Co.
Ramapo Iron Works
St. Louis Frog & Switch Co.
Wharton, Jr., & Co., Inc., Wm.

Transfer Tables
American Bridge Co.
Archbold-Brady Co.

Transfers (See Tickets)

Transformers
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Treads, Safety, Stair, Car Step
American Mason Safety Tread Co.
Universal Safety Tread Co.

Trolley Bases
Ackley Brake & Supply Corp.
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Nuttall Co., R. D.
Ohio Brass Co.

Trolley Material, Overhead
Flood City Mfg. Co.

Trolley Wire
Anaconda Copper Mining Co.
Bridgeport Brass Co.
Copper Clad Steel Co.

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Trolley Wheel Bushings
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National Tube Co.

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All Genuine Graphited Oil-less Bushings have always been made at Bound Brook, U. S. A.

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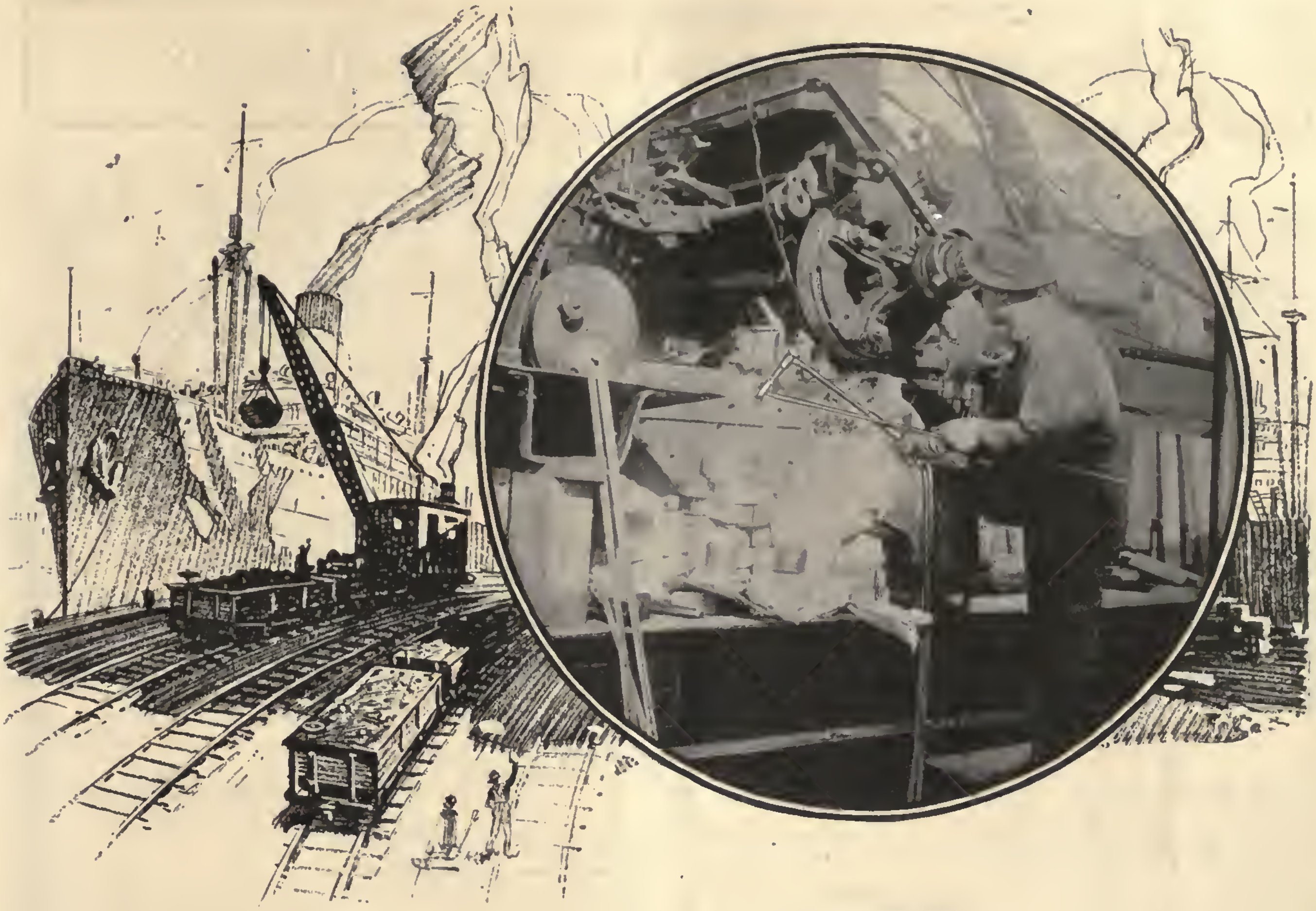

Oxweld service caught in the act

What Oxweld has done for others —

THE frame and bearings of a huge traveling crane broke clean through and the owners, who were using the crane to load ships with lumber, were confronted, in their own words with "a month's delay and a loss of many hundreds of dollars."

In this emergency they sent for Oxweld and five hours after the Oxweld Service Engineer began operations the great crane was ready for business.

The photograph shows the Oxweld Service Engineer actually on the job—note that the great machine is not dismantled.

This is the every day story of Oxweld—saving time and money.

Oxweld can do for you.

Why not let Oxweld Service Engineers, stationed in more than fifty important cities, demonstrate in *your* plant how Oxwelding and cutting is applicable to *your* business?

Write, wire or telephone to the nearest address below for immediate attention.

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OXWELD ACETYLENE COMPANY

NEWARK, N. J. CHICAGO SAN FRANCISCO

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Sales Representatives in the Principal Cities of the World

O-509-21

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"Boyerized" Products Reduce Maintenance

Bemis Trucks
Case Hardened Brake Pins
Case Hardened Bushings
Case Hardened Nuts and Bolts
Manganese Brake Heads
Manganese Transom Plates
Manganese Body Bushings
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Bemis Pins are absolutely smooth and true in diameter. We carry 40 different sizes of case hardened pins in stock. Samples furnished. Write for full data.

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GRANITE EVERLASTING

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is one of the winter problems that you must settle without delay. We can show you how to take care of both, with one equipment. Now is the time to get your cars ready for next winter. Write for details.

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STEEL CAR COMPANY
H. FORT FLOWERS, *Pres. & Gen. Mgr.*
FINDLAY, OHIO

MASON SAFETY TREAD—Lead or carborundum filled; non-slippery; prevents accidents; cuts out damage suits.
KARBOLITH CAR FLOORING—For steel cars; is sanitary, light weight, fire proof, non-slippery.
STANWOOD STEPS—Self-cleaning, non-slippery, light
Over six million feet used without accident being reported within the knowledge of manufacturer. Our products used on all leading railroads on cars and stations. For details address:
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Joseph T. Ryerson & Son, General Western Distributors.

UNIVERSAL ANTI-SLIP TREADS
cars and station steps.
Universal Safety Tread Company
40 Court St., Boston, Mass.

A Complete Cycle

In the oil industry there are a few concerns who are what is termed "A Complete Cycle"

The Texas Company is one of them.

Let us explain what this signifies specifically—and just what it means to you.

It means that we do our own producing, we own and operate our own pipe lines, refineries, steamships, tank cars, terminals, barrel factories, distributing stations, warehouses, etc.

It means that from the time the crude comes from the ground until it is delivered to the purchaser it does not leave our hands.

It is not necessary to stress the importance of this in insuring steady, uniform, dependable delivery.

For this and other reasons an increasing number of electric street railways are employing Texaco Lubricants and Texaco Service to keep down operating expense through efficient lubrication.

Next advertisement—
"Crude Resources"

There is a Texaco Lubricant for Every Purpose

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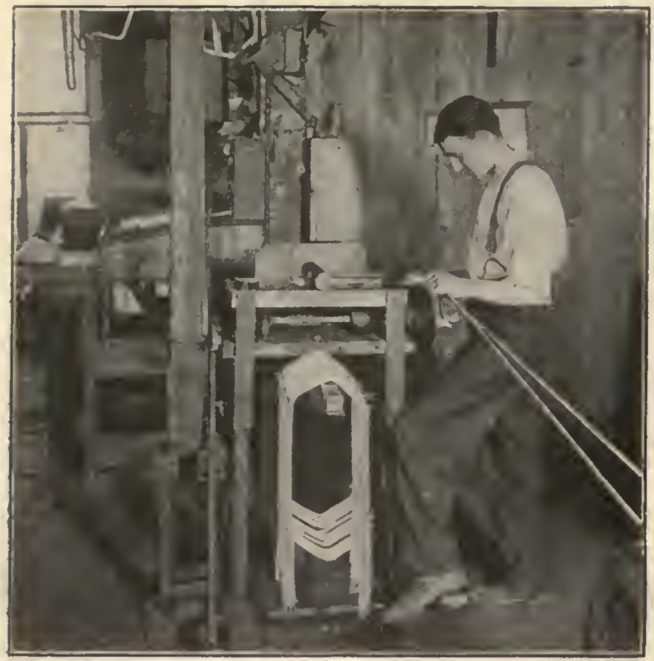

Columbia Coils Are Made Just Right

Columbia-Made Brush-holders are available for any motor

How Can Motor Maintenance in Winter Be Reduced?

As a result of the severe weather conditions in the New England section during the last winter many railway officials have been wondering if we have not over-rated the reliability of our railway motors. Reliability has always been considered as the first and most necessary requirement for electric railway service, and to maintain this motors must withstand the most severe service and abuse under the extreme conditions of winter service.

In order to obtain far-reaching results it will be necessary also for the various railway companies to improve their methods of rewinding armatures and field coils and taking care of other repairs, for obviously the motors which are now in operation will be continued in service for several years and improvements in these motors cannot be made by the manufacturers. Electric railways which are not already dipping and baking their railway windings should consider this most carefully, for it is evident that only through a more thorough waterproofing of the motors can improvements and beneficial results be obtained under these extreme weather conditions.

Columbia Specialties will answer ←this Question

There is the question—asked at the end of last year's severe winter. And above you see illustrated *the answer*—

Columbia Coils, specially designed and wound for rewinding old armatures, and

Columbia Brush Holders, used by some of the biggest electric railways in the United States—the brush holders that sell themselves by a trial.
The time to begin to reduce armature mortalities this year is NOW—write for details.

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Ernest Keller, Frank C. Hedley, Brooklyn, N. Y.
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J. L. WHITTAKER, 141 Milk St., Boston, Mass.
F. F. BODLER, 903 Monadnock Bldg., San Francisco, Calif.
W. McK. WHITE, 313 South Dearborn St., Chicago, Ill.

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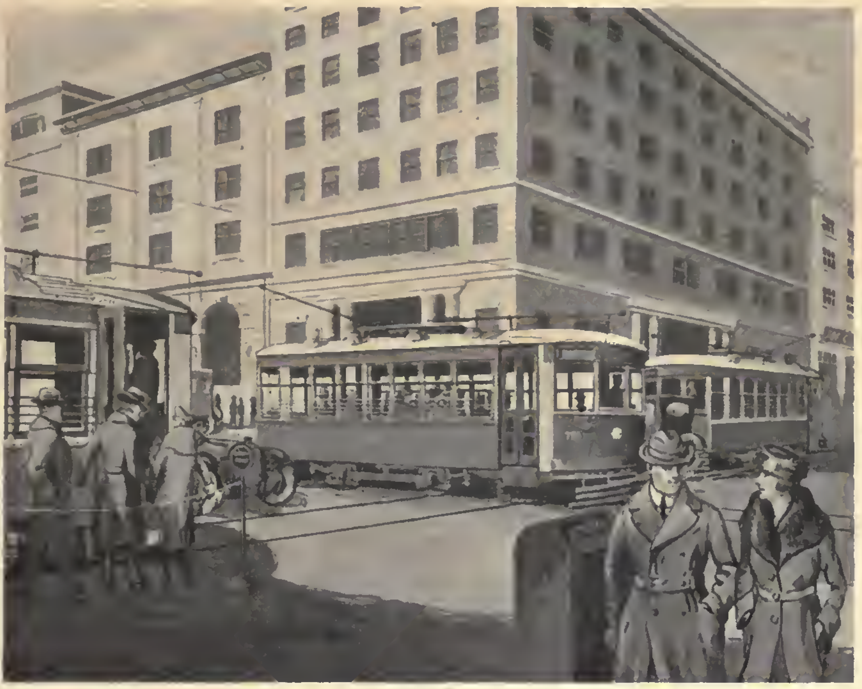
- Armature shaft straighteners
- Armature buggies and stands
- Babbitting molds
- Banding and heading machines
- Car hoists
- Car replacers
- Coil taping machines for armature heads
- Coil winding machines
- Pinion pullers
- Pit jacks
- Signal or target switches
- Tension stands

CAR EQUIPMENT

- Armature and axle bearings
- Armature and field coils
- Bearings (axle and armature)
- Brush-holders and brush-holder springs
- Brake, door, and other handles
- Brake Forgings, rigging, etc.
- Car trimmings
- Commutators
- Controller handles
- Forgings of all kinds
- Gear cases (steel or malleable iron)
- Grid resisters
- Third-rail shoe beams and accessories
- Trolley poles (steel) and wheels

The Place For Birney Safety Cars



Memo

Number of Birney Safety Cars Ordered

OVER

2800

Eight of the first 10 cities in the United States have Birney Safety Cars.

1—On Heavily Traveled Lines
ALL-DAY SERVICE

Birney Safety Cars enable a street railway to furnish a more frequent and most satisfactory transportation service during that part of the day between the peak periods, which will cost less than can possibly be furnished with any other type of car. At the same time, the increased revenue attributed to the improved service makes the non-peak period profitable as well as the peak period, and both the public and the operating company are benefited.

1. On Heavily Traveled Lines in all-day service and supplemented during peak periods with large-capacity, front-entrance, center-exit cars.
2. On Lightly Traveled Lines where an improved service with short headways will stimulate car riding.
3. On Suburban Lines under a shorter headway schedule than maintained by other types of cars.
4. On Minimum Service Lines where the franchise demands some service.
5. In Owl Service, where more frequent service will improve public relations.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.

AMERICAN CAR CO. — G. C. KUHLMAN CAR CO. — WASON MANF'G CO.
ST. LOUIS MO. CLEVELAND, OHIO. SPRINGFIELD, MASS.

High Tension Direct Current
For Universal Electrification

At Home

From the 32-mile, 1200-volt Aroostook Valley Electrification in the State of Maine to the mighty 3000-volt 661-mile Electrification of the Chicago, Milwaukee & St. Paul Railway in the States of Washington, Idaho and Montana . . .

To the forty-three new or electrified lines in between totaling 2447 more miles of route and using General Electric generating, distributing or traction equipment . . .

There is proclaimed the fact that the coming *universal* electrification of the North American continent will be high-tension direct-current, as consistently advocated by the General Electric Company almost from the beginning of the era of heavy electrification.

Abroad

Nor is this preference to be limited to North America. The 1200-volt lines of the Hershey Cuban Railway and of both Chinese and Japanese Railways; the 1500-volt suburban lines of Melbourne, Australia, the 2400-volt installation of the Bethlehem Iron Mines in Chile, and the 3000-volt electrification of the Paulista Railway in Brazil.

All of which are using General Electric traction equipment *exclusively*, prove still further the adaptability of G-E high-tension direct-current apparatus to every condition from tropical plantations to snow-clad mountain chains.

While to cap the climax, comes the conclusion of A. Mauduit, Secretary of the French Mission, which studied American electrifications in 1919 that:

> "On account of the remarkable results obtained by the Chicago, Milwaukee & St. Paul Railway with 3000 volts direct current, the writer does not hesitate to formally conclude in favor of the adoption of this system, and he believes it to be actually the only system suitable for the electrification of heavy line traction."

General Electric Company

General Office
Schenectady NY

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McGraw-Hill Co., Inc. *Monthly Mechanical and Engineering Edition* January 15, 1921

ELECTRIC RAILWAY JOURNAL

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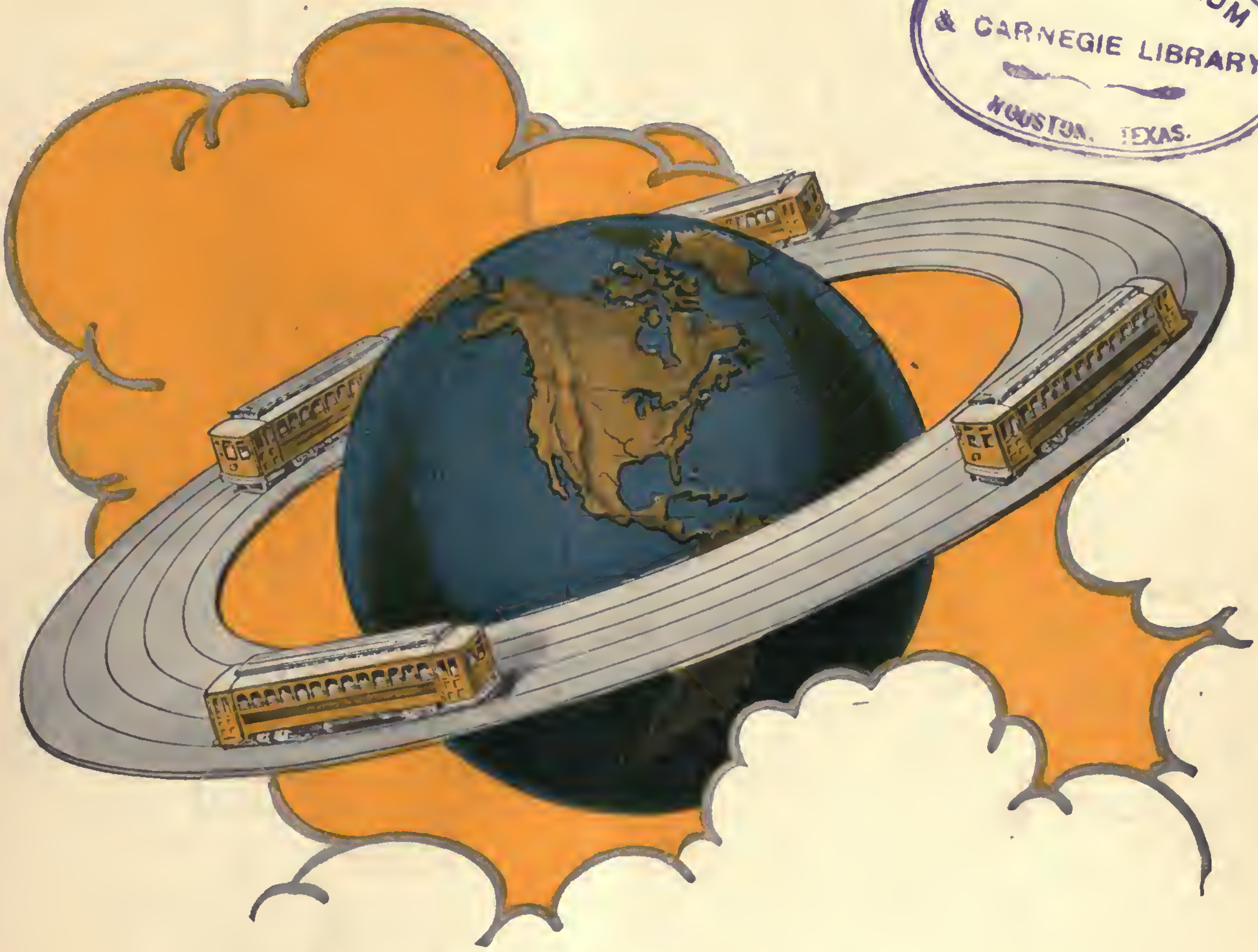

In Returning to Usual Conditions Collier Service continues its stability of income to the railways and maintains its standard of service to the advertisers

Barron G. Collier
INCORPORATED

Candler Building, New York

"Good Will"

"Joe", said the Vice President, "Mr. Goodwill, Manager of our Public Relations Department, tells me that when you boil our whole public relations problem down to common sense, it simply means that each department must work together and effectively cultivate the "goodwill" of the public. In other words, without public good will we are always going to be in hot water.

"He is planning to carry on the work of developing a friendly attitude of the public mind toward us, but states that all other departments must do their share and first impart clearly to every employee the importance of goodwill towards the company, and in turn, by their conduct, help build up and encourage the good will of all the people they come in contact with."

"That's fine, Boss", replied Joe, "I always thought a company like ours should have one department devoting its entire time to that important subject. We shall be glad to carry out the suggestions of our Sales Department, (because that is what it really is) right along and, believe me, we have the man on the job. He knows what kind of news makes a hit with the public. His last news note tells them all about our new Westinghouse Turbine, and the next one is going to tell them more about our new cars equipped with Westinghouse HL Control and No. 514 motors."

"Joe", said the Vice President, smiling, "the publicity game is easy when you have the goods that you are honestly proud to talk about. I am glad also to see you so enthusiastic about it."

Westinghouse Electric & Manufacturing Co.
East Pittsburgh Pennsylvania

Vol. 57, No. 3 New York, January 15, 1921 *Pages* 113-164

Electric Railway Journal

Henry W. Blake and Harold V. Bozell, Editors Henry H. Norris, Managing-Editor

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G. H. McKelway declares that inspectors must make certain that all joints are bonded, that proper types of bonds are used, that rails are in proper condition for bonding and that the work is done satisfactorily. Analysis of the methods to be employed to achieve the desired result. ....Page 119

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MEMBER AMERICAN ELECTRIC RAILWAY ASSOCIATION AERA 1921

Circulation of this issue, 7,150

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The Variable-Load Brake
—the Brake which automatically weighs its passengers and likewise adjusts Braking Power to make stopping distance the same with loaded, partly loaded and empty trains

8-car train on the Municipal Railway, New York City, fitted with Variable-Load Brakes.

The high speed and short headway of subway trains in the densely populated metropolitan cities call for the most efficient braking facilities possible.

Safety of passengers demand that shortest possible stops be assured; and the short headway of trains, as determined by the block signal spacing, requires that the stopping distance of trains, whether loaded, partly loaded, or empty, be uniformly the same.

These requirements are fully met by the Variable-Load Brake, whose prime and unusual characteristic is that passengers upon entering and alighting from the car, unknowingly set in operation certain automatic mechanism which varies the braking force to suit the increased or decreased load, as the case may be.

Thus short and uniform stopping distance, as prescribed and limited by the close block signal spacing, is assured.

Westinghouse Traction Brake Company

General Offices: Pittsburgh, Pa.
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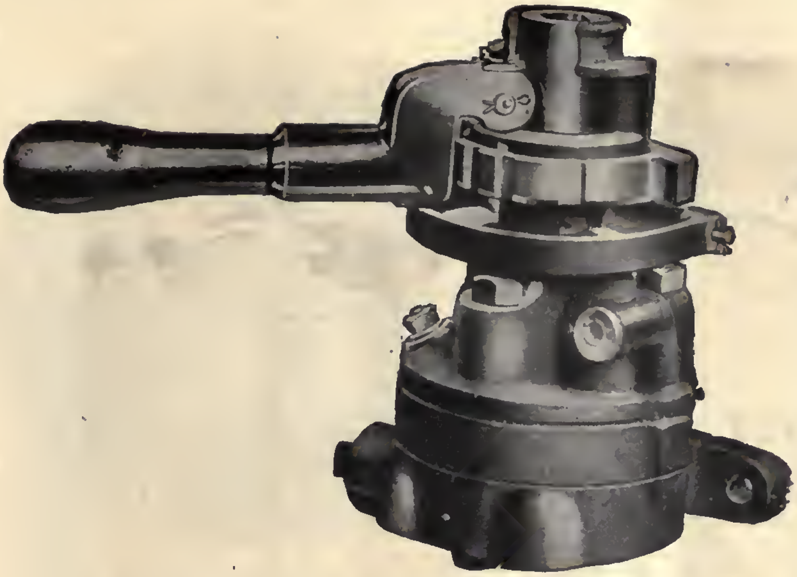


Air Brake and Safety Car Control Equipment

Satisfy the Public and Pay Dividends

The financial condition of any Electric Railway Property is dependent upon the "state of mind" of the traveling public.

This state of mind is in turn governed by the service given by the Electric Railway.

Bad or indifferent service always reacts unfavorably on business volume. Good service—satisfactory service—means increased patronage—increased revenue— dividends.

The thing to do then, is to improve service, and the logical way to do that is to operate Safety Cars. This method not only insures better service but actually decreases operating costs. Hundreds of progressive properties have proved this to their complete satisfaction.

But remember—it is a Safety Car only when equipped with automatic, laborless apparatus, so interlocked that, regardless of the illness or distraction of the operator, the power will be cut off instantaneously, the air brakes and sander apply immediately thereafter and the doors unlock for safe and easy exit. Furthermore, it is a Safety Car only when the doors must be closed before the car can start, and when the air brake must be applied before the doors are opened and the step lowered in bringing the car to a service stop.

SAFETY CAR DEVICES COMPANY

Main Office—Boatmen's Bank Bldg., ST. LOUIS, MO.

CHICAGO	WASHINGTON, D. C.	NEW YORK	PITTSBURGH	SAN FRANCISCO
Railway Exchange Bldg.	Munsey Bldg.	City Investment Bldg.	Westinghouse Bldg.	Southern Pacific Bldg.

CANADA—Canadian Westinghouse Co., Ltd., Hamilton, Ont.

Copper for Power Transmission

Consider the metals that can be used as conductors of electricity. They are limited to three in number—copper, iron and aluminum.

Of these, copper is pre-eminently the best, combining, as it does, high conductivity, malleability and ductility.

For the utmost in economical power transmission use copper wire. For the utmost in copper wire specify Anaconda. It is made from pure electrolytic copper of average conductivity of 100.75% Mathiessen's Standard.

"From Ore to Finished Product" is your guarantee of maximum quality.

ANACONDA COPPER MINING COMPANY
Rolling Mills Department
Mills—Great Falls, Montana
General Office: 111 W. Washington St., Chicago

ANACONDA Copper Wire
"From Ore to Finished Product"

IMPERIAL HEADLIGHTS
FOR EVERY TYPE of CAR

Whether your cars operate on bright streets, through dim suburbs or on private right of way, there are Crouse-Hinds Imperial Headlights for them.

You can pick a type with just the right quantity and quality of illumination, and be sure that it will serve steadily, dependably.

Incandescents, Luminous Arcs and Carbon Arcs are included in the complete Crouse-Hinds Imperial Line.

The Ohio Brass Company
Mansfield, Ohio
New York Philadelphia Pittsburgh Chicago
San Francisco Los Angeles

Exclusive Sales Agents in the U. S. for Crouse-Hinds Imperial Headlights.

Don't Blindfold Your Motorman

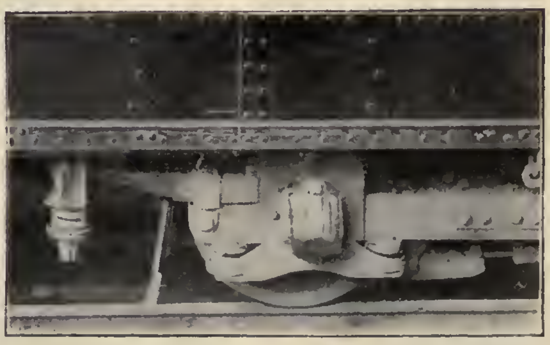
Don't Blindfold the Motormen on your Safeties against what is happening or is liable to happen to the car ahead. It's the lack of just this knowledge that is responsible for costly rear-end accidents.

Give them Nichols-Lintern Indicating Signals which insure safety by showing the motormen as well as the driving public, the exact operation of the car ahead. The first cost will be offset by an immediate reduction of claims.

In addition to eliminating rear end collisions, Nichols-Lintern Indicating Signals save power by inducing coasting, reduce the number of brake movements, and cause less wear and tear on motors, brakes and trucks.

On one road operating 1400 cars of which 700 were N-L equipped, only one rear end collision out of 82 that occurred during a test period was on a car equipped with Nichols-Lintern Indicating Signals.

Mechanical Sanders are Life Savers When Air Is Lost



As an emergency device, the N-L Mechanical Sander with hand brake is a real life saver because it is the only combination that can prevent cars from running away when the air is lost.

As an economical device in regular service, N-L Mechanical Sanders prevent the motormen from misapplying their control apparatus, starting the emergency flow of sand and flooding the track with it.

N-L Mechanical Sanders will apply all the sand you need and no more and your cars will not come back empty to need complete refilling every night.

Ask us to explain in detail.

The Nichols-Lintern Co.

8404 Lorain Avenue Cleveland, Ohio

Keystone Steel Gear Cases

"Riveted for Strength—Reinforced by Spot Welding"

Made in standard forms for practically all modern types of railway motors.

By experience it has been found that a rivet is strong in one direction and a spot weld in exactly the opposite — against slipping.

To secure the strongest possible construction Keystone cases are riveted and welded. Soft, open-hearth, special analysis steel of extra quality is used in the construction of these cases and breakage or tearing out of the sides is practically unknown.

Brackets are either steel or malleable iron castings or steel forgings and the manufacturing process and design of these cases insure maximum strength and service.

There is a lot more about them—
Write for data sheets

ELECTRIC SERVICE SUPPLIES Co.

Manufacturer of Railway Material and Electrical Supplies

PHILADELPHIA
17th and Cambria Streets

NEW YORK
50 Church Street

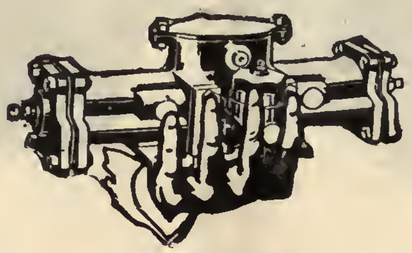
CHICAGO
Monadnock Building

Standardize!

NATIONAL

Rush-hour Engineer

Raise Man Standards



By enabling you to pick your car-men for brain and not for brawn.

By enabling you to *hold* your men, because they are relieved of the fatigue that poisons the temper exactly as fatigue poisons the body.

By building up self-respect, which comes far easier to men who are masters *of* their tools than to men who are mastered *by* their tools, a simple psychological truth which means much to you in building up platform salesmanship.

NATIONAL

Rush-hour Engineering the Following Line for

Manual and Pneumatic Door, and Step Control to make the opening and closing of doors and steps less laborious or even entirely laborless.

Door and Step Operating Mechanisms to insure the smoothest possible operation and the lowest possible upkeep of the pneumatic and other working parts.

Motorman's Signal Lights to eliminate the conductor's signal cord and the waste of time in fumbling for it, while forgetting to watch the farebox.

National Pneumatic Company, Inc.
50 Church St., New York Edison Bldg., Chicago
Works: Rahway, N. J.

Manufactured in Canada by
Dominion Wheel & Foundries, Ltd.
Toronto, Ont.

Standardize!

Pneumatize!

PNEUMATIC

ing and Equipment

Raise Service Standards

Not alone on the human side, but on the mechanical side.

Can you doubt for a moment that your patrons will fail to appreciate that you have gone to a higher service standard when they see that safer, faster automatic movement in door, step and starting operations produces higher schedule speeds than the slow, precarious and laborious movement inevitable to wearied human muscle.

PNEUMATIC

and Equipment Covers
Any Kind of Service

SAFETY INTERLOCKING DOOR CONTROL to give literally the speed of lightning in starting the car and yet make impossible the accidents of misunderstanding that occur with hand-actuated signals.

MULTIPLE UNIT DOOR CONTROL to do pneumatically what multiple unit control has done electrically, namely, permit the control of *every* car in the train from *any* car in the train.

We are at your service in 1921 as in the past!

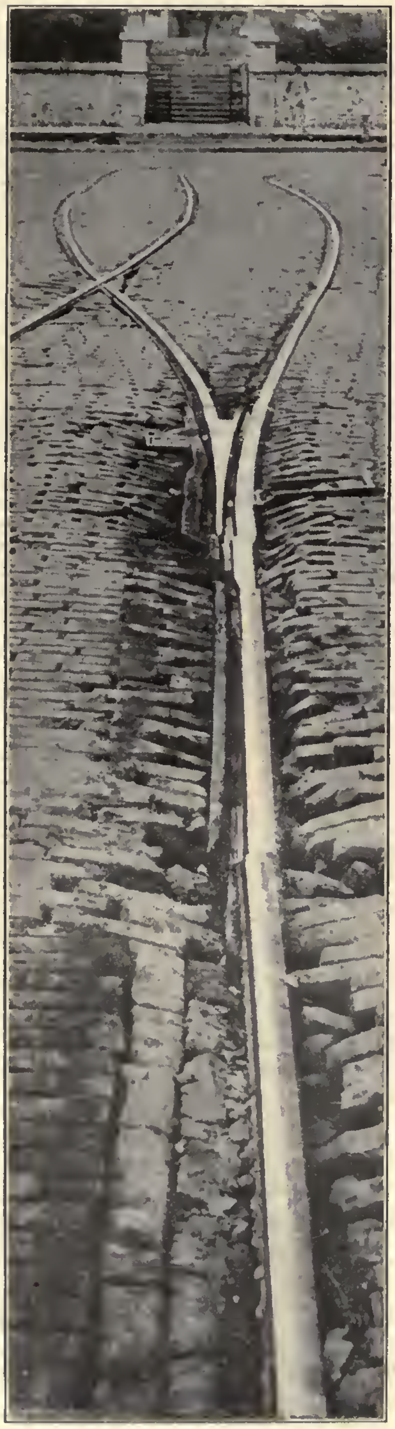
National Pneumatic Company, Inc.
50 Church St., New York Edison Bldg., Chicago
Works: Rahway, N. J.

Manufactured in Canada by
Dominion Wheel & Foundries, Ltd.
Toronto, Ont.

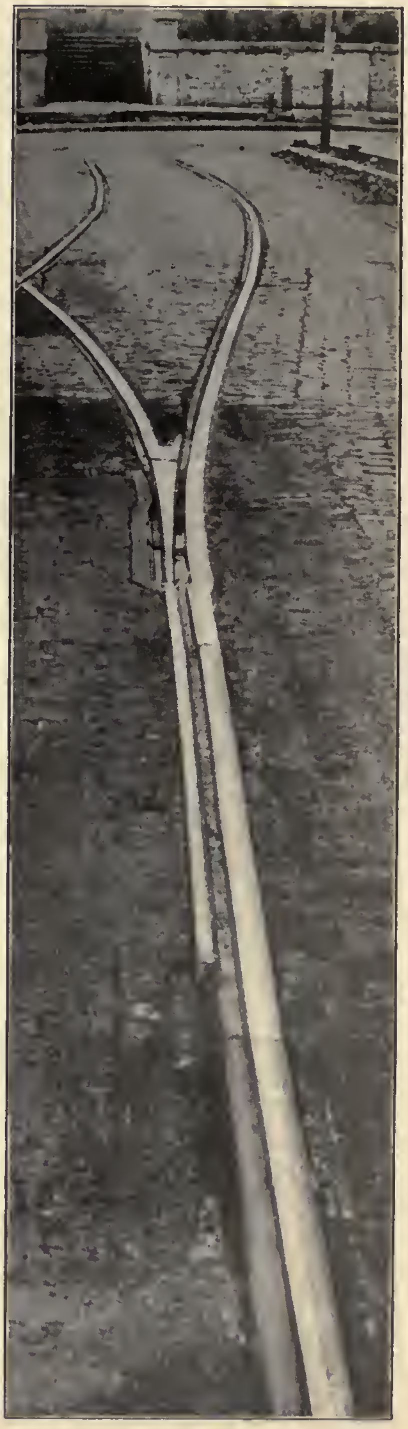
Pneumatize!

Resiliency applied to loose and sunken joints

Before



After



Loose and sunken joints result from poor foundations. They often necessitate the reconstruction of track, long before the portion between joints has given its maximum service.

Shimming up the joints is only an expensive temporary repair and does not remedy the real cause of the joint failure. THE DAYTON JOINT BOOSTER fastened to the base of the rail affords the means of applying a concrete foundation to the joint, which will be preserved through its

Resiliency

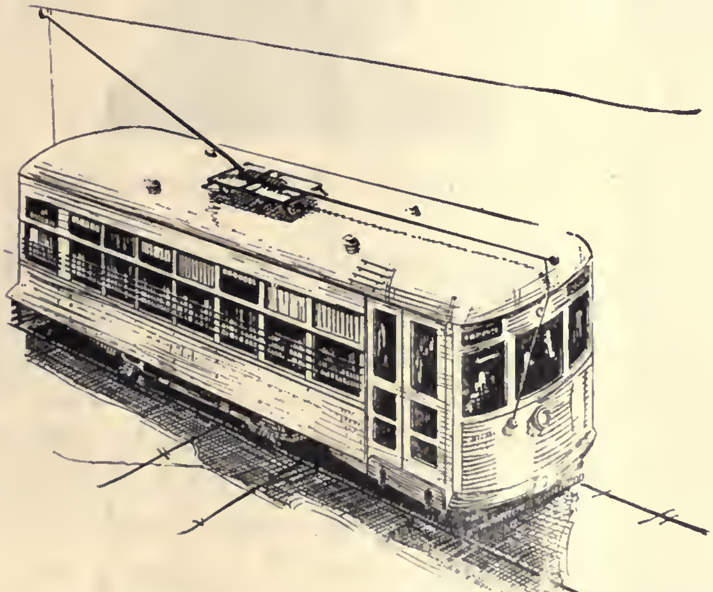
and make the repair permanent.

The installation is simple, inexpensive, and with no interruption to traffic.

Four dollars and fifty cents will buy this permanent cure. Order today and learn for yourself.

THE DAYTON
MECHANICAL TIE CO.
704 COMMERCIAL BUILDING
DAYTON, OHIO

SAFETY



With Increased Revenue

from faster schedules is the result obtained by installing U. S. Electric Signals. The safety car will increase your schedule speed if you'll only give it a chance.

Protect your public and yourself by specifying U. S. Electric Signals.

Fitted with both disks and lights, they are discernible from a great distance, allowing for no unlicensed entry of the block.

Let us prove to you
what they will do.

United States Electric Signal Company
West Newton, Massachusetts

Representatives:
Western: Frank F. Bodler, Monadnock Bldg., San Francisco
Foreign: Forest City Electric Services Supply Co., Salford, England

Get Extra Rail Service Without Extra Investment

Getting rails with a good wearing surface under steady traffic and safe from cracking and fracture under the severe stresses of present-day heavy wheel loads is one of the maintenance-of-way engineer's greatest problems.

Aside from chemical composition, which is now well standardized, one of the biggest factors in rail life and safety is the presence on the rail of an outer layer or skin of partially decarburized and weak surface metal that in the ordinary process of rolling remains in the finished product.

This means that the comparative softness of the bearing surface on the rail head invites undue wear and sloughing off to one side, while the conversion of air cells and impurities in the original ingot surface into streaky, laminated outside metal, leaves weak spots in the rail base, where under flexure and stresses from load the seams tend to open, enlarge and ultimately weaken the rail to the degree of fracture.

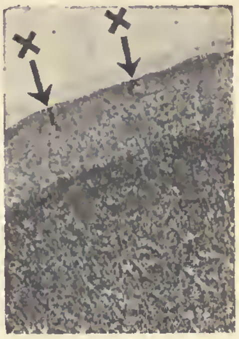


Figure 1

The Lackawanna Deseaming Process is the first and only successful method of overcoming these faults, and like many other important improvements is extremely simple in theory and in application.

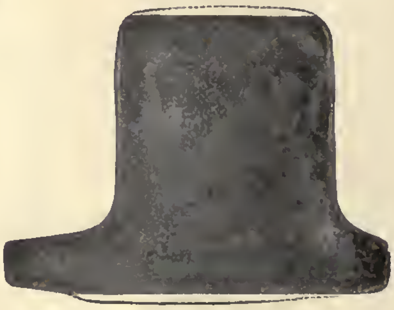


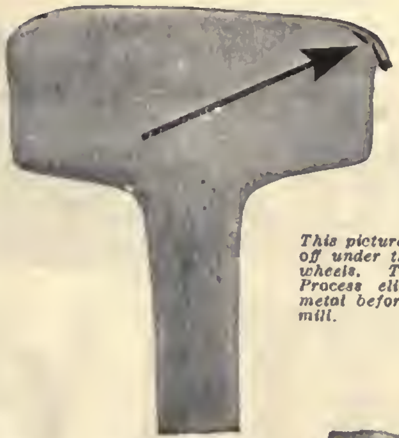
Figure 2

The two detail pictures tell the story. Figure 1 is a full-sized photo reproduction of a section cut from a steel ingot, polished and etched. The soft, partly decarburized skin metal, which has been subjected to various oxidizing processes while the ingot was in the soaking pit, is clearly differentiated from the harder interior metal by its lighter color. At X X are shown two incipient seams, originally air bubbles formed as the ingot was poured into the mold. When the ingot is rolled this soft skin metal, with all the surface flaws, is stretched out thinner and thinner, and the air holes become seams.

The Lackawanna Deseaming Process hot-mills off this soft, streaky skin metal at the two critical locations, the rail head and base (see Figure 2) at a point in the rolling process just after the bar has passed through the roughing passes. The finishing rolls therefore do their work on the hard interior metal which is free at the base from seams that spread under flexure in service, and free at the head from the soft spots that otherwise wear into depressions or slough off under the cold-rolling action of the wheels in service.

Rails treated by the Lackawanna Deseaming Process are obtainable at no greater first cost than for ordinary rails but will show a decided saving in maintenance.

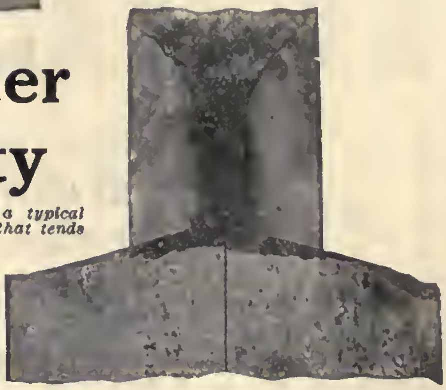
If you wish to know in detail about the greater load capacity and safety assured by this process, send for our interesting book.



Better Service

This picture shows a rail head sloughed off under the cold-rolling action of the wheels. The Lackawanna Deseaming Process eliminates this weak surface metal before the rail is finished in the mill.

Greater Safety



This picture shows a typical base seam—the kind that tends to open up and cause fracture. The Lackawanna Deseaming Process prevents rail failures by eliminating the weak surface metal which causes such seams.

For Railroad Construction Work

Lackawanna

Steel Sheet Piling

Thousands of tons of Lackawanna Steel Sheet Piling are used by American Railroads for construction and permanent protection of bridge piers, temporary and permanent retaining walls, grade elimination work, etc. Maintenance departments which keep a stock of Lackawanna Sheet Piling on hand as permanent equipment find this material an invaluable help in repairing washouts and for other emergency jobs.

Lackawanna Sections are made in a wide range of types and sizes from which one can be selected for safety and economy under practically any conditions.

The Lackawanna Flexible Interlock is not only superior in strength and watertightness but permits obstructions in the piling line to be passed without undue deflection and is adapted to the construction of irregular walls and small circular enclosures.

Our Sheet Piling Engineers will gladly cooperate with railroad construction officials in determining the most desirable methods and sections for difficult work and will submit valuable cost data.

Elcannes

Concrete Reinforcing Bars

The broad and deep depressions at regular intervals in the bar surface take the place of excess and waste metal comprising the projections on ordinary types of deformed bars.

The bonding surface of the Elcannes Bar is 15 per cent greater than that of a plain square bar of the same nominal size.

The Elcannes Bar is uniformly designed; the deformations being so arranged on opposite sides of the bar that a practically unvarying cross-sectional area is maintained.

The regular surface and uniform section render handling easy and reduce the difficulty of fabrication or bending in shop or field.

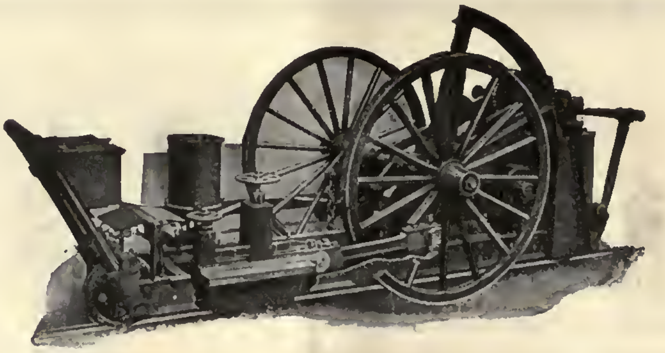
The Elcannes Bar is manufactured exclusively by the Lackawanna Steel Company. Send for complete information.

Lackawanna Steel Company

General Sales Office and Works: Lackawanna, N. Y.

Boston Buffalo Chicago Cincinnati Cleveland Detroit New York Philadelphia St. Louis San Francisco

SOLE EXPORTER OF OUR COMMERCIAL PRODUCTS CONSTECO CONSOLIDATED STEEL CORPORATION 165 BROADWAY, NEW YORK, U.S.A.



S. O. S.

When your track is in such bad condition from corrugations and cupped joints that renewals apparently offer the only remedy, send out an S. O. S. for the

Reciprocating Track Grinder

It will not only save your track from immediate replacement, but will increase its life from 15 to 40 per cent.

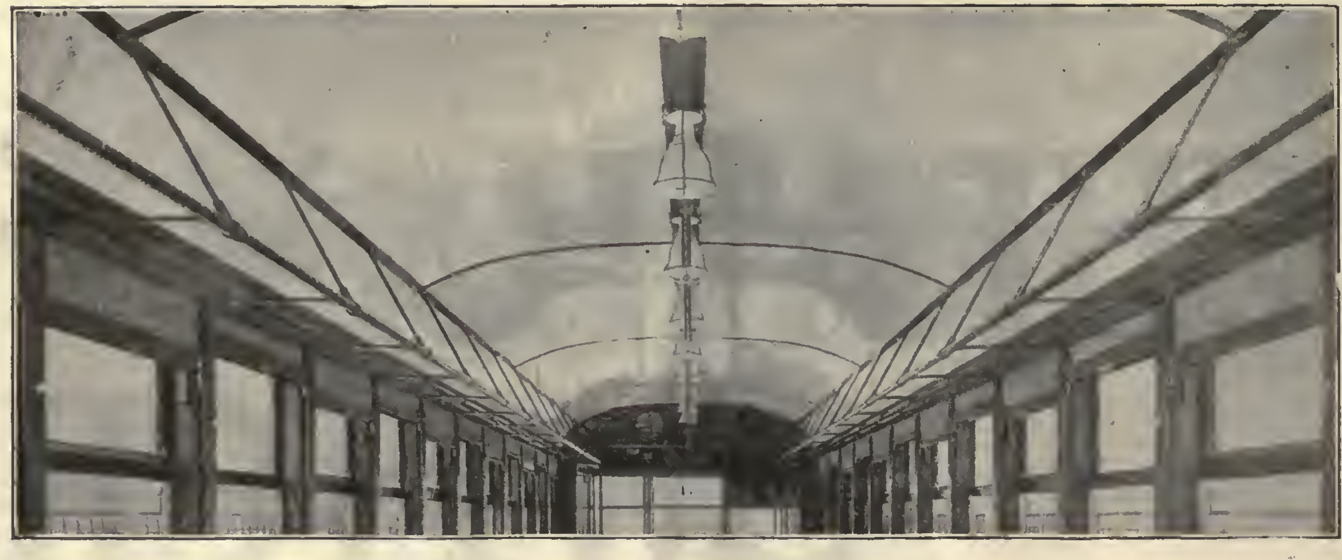
Tell us your track troubles—and your problems will be met—cheaply, efficiently and thoroughly with the Reciprocating Track Grinder.

RAILWAY TRACK-WORK CO.
3132-48 East Thompson St., Philadelphia, Pa.

CHEATHAM SWITCH

SAVES SECONDS

Watch the time cars stop at switch points. A few seconds saved at each switch, by each car, totals hours of lost time. A serious matter in two man car operation; a vital question with one man cars. Speeds up schedules; improves service; increases public satisfaction. Cheatham Electric Switching Device Co., 4780 Louisville Ave., Louisville, Ky., U. S. A.



NEVASPLIT HEADLININGS

do more than never split

They never shrink, warp nor check.

They are waterproof and of minimum conductivity.

They make car interiors safer and more beautiful.

The smooth, even surface takes paint most readily, with pleasing results.

They mean lighter cars—lighter in weight and appearance and "illumination."

NO WONDER so many big roads use them—for instance, the 100 new cars of the Philadelphia Traction Company.

Write for Booklet and samples

The Keyes Products Company
120 Broadway, New York

Columbia Machine & Malleable Iron Co., 30 Church St., New York
National Safety Car & Equipment Co., St. Louis, Mo.
SAN FRANCISCO: Ford & Geirrine, Merchants Exchange Building

Buy The Ties For The Job

KEEPING the inventory of maintenance-of-way material down is good policy.

One thought right now with wood ties at prohibitive prices is to use STEEL TWIN TIES and buy only for the job.

Our increased capacity and large stock makes possible very prompt deliveries.

We will be pleased to tell you what STEEL TWIN TIES will cost at your delivery point and to make delivery promises, that you can bank on.

THE
INTERNATIONAL STEEL TIE CO.
CLEVELAND, O.

Steel Twin Tie Track

SAFETY cars and sixty-five ton interurbans are running on Steel Twin Tie Track. One minute headway and high speed; infrequent service and low speeds are scheduled over Steel Twin Tie Track on over one hundred properties.

In the eleven years, since the first installation was made, Steel Twin Tie construction has met all unfavorable conditions that shorten the life of paved street track and its record is enviable.

That it also meets the important requirement of low first cost, makes the request for your consideration almost imperative when you plan new construction.

THE INTERNATIONAL STEEL TIE CO.
CLEVELAND, O.

In 1921

It will be of vital importance that adequate steps be taken to eliminate the great loss on electric railways arising from Absenteeism, Overtime, Waste, Labor Turnover and Under-production. As an operating head, you are, no doubt, giving this matter consideration.

It should be thoroughly realized that this great loss arises mainly from the mental attitude of your employees. Failure to realize this basic fact is costing many employers large sums and is standing between them and a proper solution.

It should also be realized that the negative mental attitude of your employees is the direct fruit of the destructive education which they have received.

Your workers produce only as much as they *think* they ought to produce. The negative results which are in evidence in many directions abundantly prove the prevailing negative mental attitude.

Our success in the field of constructive education for workers has built for us the largest business of its kind in the world. Our work is not an experiment in any sense but has been tried and tested hundreds of times in practically every basic industry on this Continent. Our clients include numerous large concerns, working as high as 100,000 men or more each. We have only one product to sell, and that is our proven ability to increase results for management.

Ask our nearest office to send a representative to explain how you can profitably use our constructive work on your property.

There is no obligation.

SHERMAN SERVICE INC.

Production Engineering Industrial Co-ordination

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Cleveland
Park Building

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208 So. La Salle

Detroit
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Pittsburgh
401 Wood St.

Philadelphia
1211 Chestnut St.

New Haven
42 Church St.

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Reliance Bldg.

Boston
10 State St.

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Montreal
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St. Louis
314 No. Broadway

Toronto
10 Adelaide St., East

Largest organization of its kind in the world.

SHERMAN SERVICE

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EXPORT TRADE
can help America NOW

WRITERS and speakers have repeatedly urged the great and growing need of export trade on the part of American industries.

With normal domestic consumption below our greatly expanded facilities for production, foreign trade is vital to our continued prosperity and progress. Fluctuations of demand in the home market today emphasize the special value of foreign trade as a compensating force tending to offset the disturbing influence of such fluctuations.

Foreign trade can help America NOW—and American producers and sellers can best serve the national welfare, and their own interests by equipping for successful trading in the foreign field.

SUCCESSFUL foreign trading is founded on an exact understanding of the market. In fact, this truth holds good in all trading—domestic as well as foreign. But in foreign commerce it is imperative.

It is, then, an immediate essential in the promotion of foreign trade to seek the aid of agencies through which information of dependable character, and in a form directly usable by *you* in relation to the market possibilities and conditions affecting *your* particular commodities, can be obtained.

The means of foreign sales promotion adopted should, moreover, be especially organized to present *your* special proposition in just the right way to just the right people.

INGENIERIA INTERNACIONAL provides this double service to the manufacturer and export manager seeking to market machinery and industrial equipment in Latin America and Spain.

Its *Research Department* has exact information available to *you* in regard to a great variety of general and specific products of the above mentioned character in these fields.

Fifteen thousand engineers and industrial executives look to each issue of INGENIERIA INTERNACIONAL for dependable and exact information on engineering progress and accomplishment, and for data on machinery and equipment, vouched for by publication in its advertising pages.

Through its comprehensive knowledge of Latin American and Spanish engineering and industrial conditions and needs, INGENIERIA INTERNACIONAL has earned the confidence of the Latin American and Spanish engineering and industrial executive in the integrity and value of its service.

In so doing, INGENIERIA INTERNACIONAL has created ready to your hand, an instrument especially adapted to win for American machinery and industrial equipment and materials—YOUR products — the *buying confidence* and patronage of Latin America and Spain.

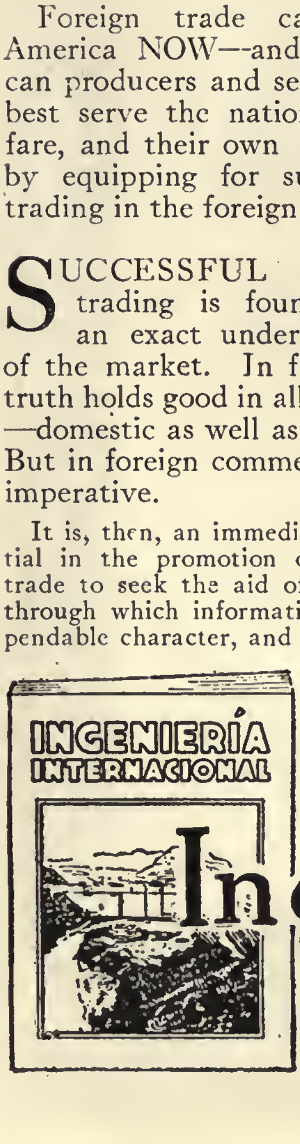
VERNE LEROY HAVENS
Editor of Ingenieria Internacional

FROM January to August of this year, Verne Leroy Havens, editor of INGENIERIA INTERNACIONAL traveled through South America, down the West Coast and up the East, establishing direct contact with the readers of the paper, studying conditions, at first hand, and assuring a continuous contact by establishing a staff of resident editors in all the Latin-American countries.

Basic thinking lies behind the building of INGENIERIA INTERNACIONAL. Never in the history of export publishing has a paper been built on such a foundation.

For more than seventeen years, Mr. Havens was engaged in engineering, financial, commercial and industrial investigation, construction work and in building and operating public utilities in Latin America. With a thorough understanding of economic and industrial conditions in Latin America and Spain, and a comprehensive knowledge of American engineering methods and practice, he and his associates are ideally fitted to direct the policies of INGENIERIA INTERNACIONAL.

The counsel and advice of the paper are always at the service of American manufacturers. The letters and diary of Mr. Havens' trip will shortly be issued in book form. While the edition will be limited, interested manufacturers may obtain a copy by writing to our New York office.



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IRVINGTON INSULATION

Provides Maximum Protection

Increased facilities, including our new bleachery, enable us to meet your requirements promptly. Check up your needs and select those IRVINGTON products which are best adapted to your particular needs.

Six Factors of Quality

High Dielectric Strength.
Added protection for the same construction.

High Resistance.
Leakage reduced to minimum.

Flexibility.
The flexible nature of the material increases speed and efficiency of production without reduction of standards.

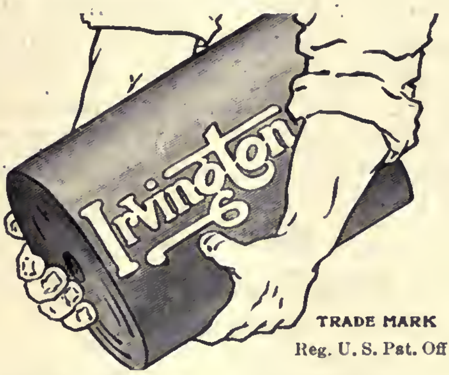
Non-Hygroscopic.
Leakage attendant upon atmospheric changes eliminated.

Heat-Resisting.
Not affected by working temperatures.

Chemically-Neutral.
Does not affect and is not affected by impregnating compounds or varnishes.

Irvington Products

Oiled Silk
Varnished Paper
Black and Yellow Varnished Cambric
Flexible Varnished Tubing
Special Folded Paper for Coil Windings
Special Adhesive
High Dielectric Paper
Insulating Varnishes



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Reg. U. S. Pat. Off.

Large stocks of IRVINGTON Insulation carried by the following representatives :

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Main Office

Irvington Varnish & Insulator Co.
Irvington, New Jersey
Established 1905

Iron-Bound Necessity of Reducing Line Maintenance Costs Is the Sole Reason for Flood City Trolley Line Specialties

FLOOD CITY

specialties will cut your costs, give greater reliability and insure longer life to your line and equipment. Our manufacturing facilities are such that we produce equipment of superior quality. Just now we are making deliveries from stock. What are your needs? One trial and you'll use no other.

Write for details.

Flood City Mfg. Co.

Johnstown, Pa.

JOHNSON CHANGE MAKERS FOR IMMEDIATE DELIVERY

The only change maker adjustable to the ejection of any required number of coins.

Supposing a six cent fare is in effect on your property and you are using a change maker designed to eject four pennies at one operation. What happens if the fare is increased to seven or eight cents? You probably discard your old change maker and buy new ones constructed to eject three or two pennies.

But when you use Johnson Universal Change Makers this is unnecessary. A screw driver and two minutes' time is all that's needed to *adjust* the slides to eject from 1 to 5 coins or 1 to 6 metal tickets.

The Johnson Change Maker is the only one on the market having this adjustable feature.

Then there's the *flexibility* of the Johnson—flexibility made possible by *unit construction.* Each barrel can be used separately or in groups suitable to meet local conditions. Barrels are designed to handle dimes, nickels, pennies and metal tickets of two denominations.

The rigid construction of the Johnson Change Maker is a positive guarantee against the ejection of the incorrect number of coins. You can absolutely depend upon the accuracy of the Johnson. Once it is set to eject a certain number of coins it *cannot get out of adjustment.*

The frame work and slides of the Johnson Change Maker are made of 18% nickel silver which will not corrode or tarnish, but will always remain bright. Nickel silver is the most rigid metal that can be used. All parts not subject to wear are made of Aero Metal which insures light weight with greatest mechanical strength.

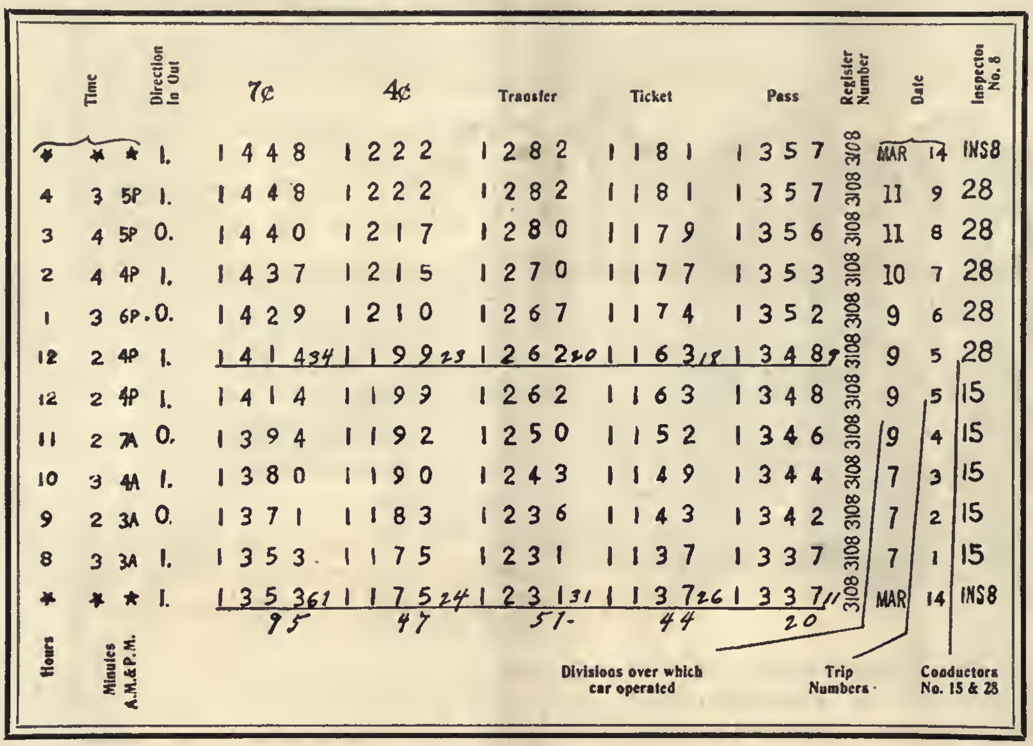
Special tools and dies insure the greatest possible accuracy in the construction of Johnson Change Makers. Production is now sufficient to insure immediate delivery of quantities sufficient to meet your requirements.

It will pay you to investigate the time and money saving characteristics of the only adjustable change maker on the market. Write today for complete data and prices.

JOHNSON FARE BOX COMPANY

Ravenswood, Chicago, Ill.

The Ohmer System



Time			Direction In Out	7¢	4¢	Transfer	Ticket	Pass	Register Number	Date		Inspector No. 8
★	★	★	I.	1448	1222	1282	1181	1357	3108	MAR	14	INS8
4	3	5P	I.	1448	1222	1282	1181	1357	3108	11	9	28
3	4	5P	O.	1440	1217	1280	1179	1356	3108	11	8	28
2	4	4P	I.	1437	1215	1270	1177	1353	3108	10	7	28
1	3	6P	O.	1429	1210	1267	1174	1352	3108	9	6	28
12	2	4P	I.	1414 34	1199 23	1262 20	1163 18	1348 9	3108	9	5	28
12	2	4P	I.	1414	1199	1262	1163	1348	3108	9	5	15
11	2	7A	O.	1394	1192	1250	1152	1346	3108	9	4	15
10	3	4A	I.	1380	1190	1243	1149	1344	3108	7	3	15
9	2	3A	O.	1371	1183	1236	1143	1342	3108	7	2	15
8	3	3A	I.	1353	1175	1231	1137	1337	3108	7	1	15
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				95	47	51-	44	20				
Hours	Minutes A.M.&P.M.											

Divisions over which car operated

Trip Numbers

Conductors No. 15 & 28

The principles of good business are maintained by the Ohmer System of fare protection. Each transaction is clearly indicated to the passenger and recorded in black and white at the time. The records from each Ohmer Register are compact, full of detail, easily analyzed and untamperable.

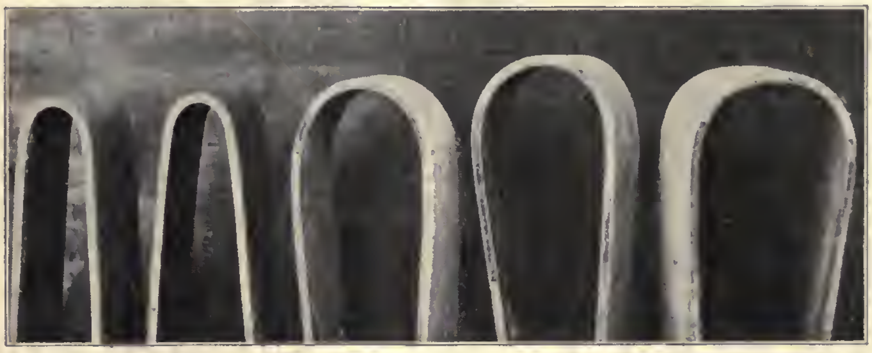
Fares are received quickly. The passenger, the conductor and the management all get a square deal.

The Ohmer System can be applied to any electric railway property without tying up any of your capital. We bear the investment burden. Our contracts are sufficiently flexible to take care of changing conditions, increased fare rates, etc., and you need never fear being caught with a lot of obsolete devices on your hands.

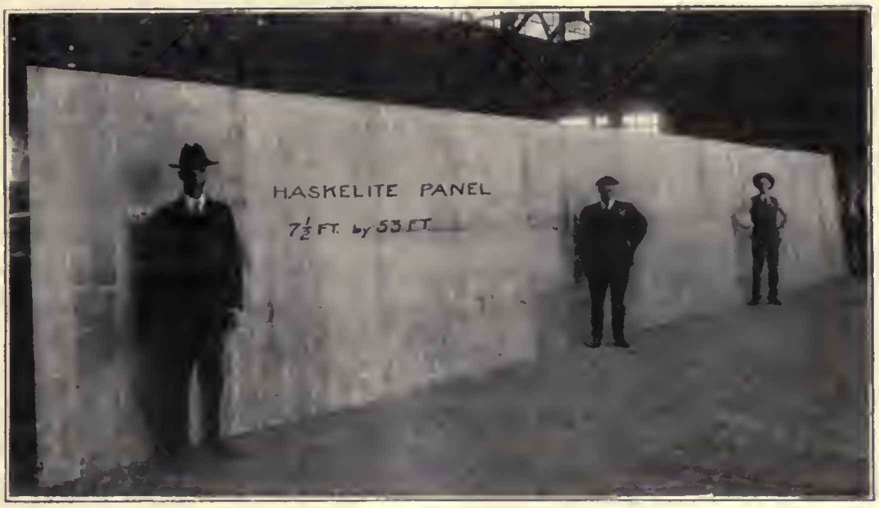
Ohmer Fare Register Company
Dayton, Ohio

HASKELITE HEADLINING

Does Not Bulge or Sag



Haskelite is a scientifically made plywood, glued with waterproof glue. These horseshoe bends were made of flat three-ply strips, softened by boiling, then bent and dried. No separating of plies.

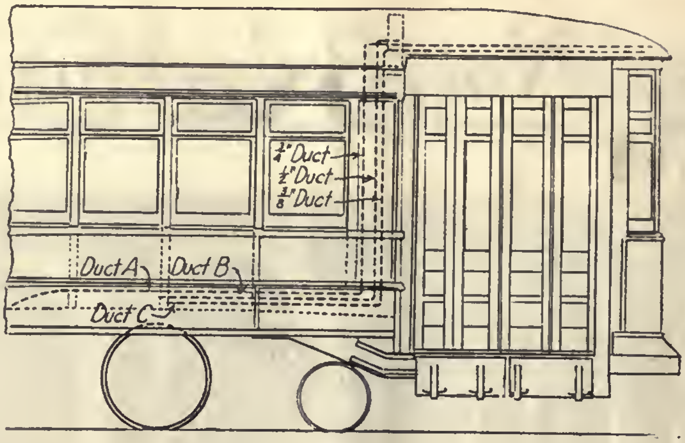


Haskelite may be made in large sheets so that joints are unnecessary.
The panel shown is 53 feet long.

Haskelite in 3/16 inch and ¼ inch thickness is usually used for car lining. Inch stock is flexible and readily bent. It is stronger than steel per unit of weight and lighter than wood pulp boards.

Haskelite Manufacturing Corporation
Chamber of Commerce Building
CHICAGO, ILLINOIS

Dotted Lines to Car-Wiring Perfection



DURADUCT

The Quality Conduit

DURACORD

The Quality Cord

Five or six years ago it took courage to install Duraduct even on a few circuits. Indeed it was done largely on our say-so that there was something not only far lighter and less expensive but safer and easier to use than the metal or hard fiber pipe, then threatening to take the place of no conduit at all, flimsy hose or the inaccessible trench boxes.

This drawing shows one of the early installations in which Duraduct, the original non-metallic single wall woven conduit with the dotted line on the interior surface, was installed in the ¾ in. size for the trolley wire, ½ in. size for the buzzer feed wires and ⅜ in. for the motorman's rear signal bell.

Contrast this with the present use of Duraduct on every kind of circuit and you will understand our confidence in recommending

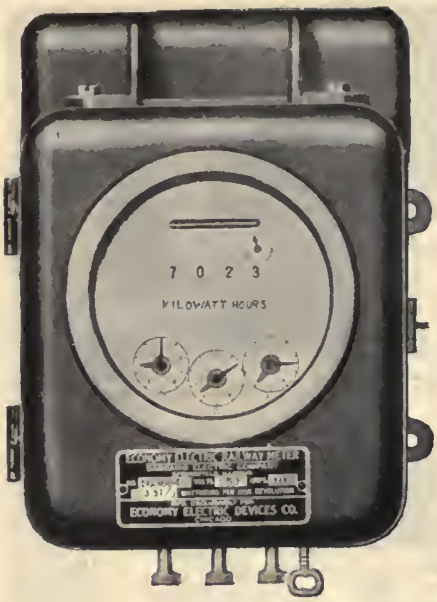
DURACORD

the portable cord with the heavy woven cover saturated to resist acid, and water proofed, with the better-than-Underwriters' construction, is fast replacing ordinary portable cords around car-shops and cars.

Wherever you wish to run an exposed length of wire—be it in the street for trackwork, in the pit for lighting or inspection, in the cars for non-conduit wiring or between the cars for power, light, heating and signal cables—there is your place for Duracord.

Let us send you samples of Duracord to compare with the ordinary kind so you can appreciate why we call Duracord "The Quality Cord"

Tubular Woven Fabric Co., Pawtucket, R. I.



Rainier Valley Lines

Order

ECONOMY METERS

with Car Inspection Dials

This progressive city and interurban line will equip all active cars *to save power at the car* and to *save labor at the car house.*

Any "Power-Saving" Device will induce energy savings but only the Economy Meter will get the maximum saving with no hazard to passengers or equipment. The Economy Meter gives the only actual check on how much energy is consumed per man or car. The records from Economy Meters actually show a motorman whether he has saved power—and how much. No other devices do this.

The ECONOMY "Power-Saving" and Car Inspection Meter provides a method that accurately and automatically shows when inspection is needed. It also shows at a glance how much more work a car can do before inspection is needed, or, in case of a road failure, how much work the car has done previous to the failure. All this is had without any clerical labor.

The records from Economy Meters are of high value for managerial and engineering purposes.

Economy Power-Saving Meters tell you—without trouble

1. WHO are your careful, economical motormen.
2. WHICH motormen need instruction in proper handling of car equipment.
3. HOW much power is being saved by motormen collectively, and individually, by direct reading units of power.
4. HOW much power is being used on any section of your lines.
5. HOW much power is being used in trailer service.
6. HOW much power your freight and express service is using.
7. HOW much power is being used for switching and car movements in yards.
8. WHAT is the line loss on your D.C. distribution.
9. WHEN your schedule speeds are too high or too low.
10. WHAT is the most economical equipment for any service.
11. WHAT are the proper gear ratios for given service conditions.
12. WHEN each car should be inspected.

Meter the energy—that's what you want to save

Economy Electric Devices Company

L. E. GOULD, Pres.

Old Colony Bldg., Chicago

Cable Address: Sangamo, Chicago

National Railway Appliance Co., New York
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COLD!

—but not in the cars equipped with Consolidated Electric Heaters and Consolidated Thermostatic Control

Cross Seat Type Elec. Heater

No—For These Cars

will be kept at the

Right Temperature Automatically

because of the even distribution of heat made possible by the use of these efficient light-weight heaters with a simple and reliable control system which will pay for itself in coal saved within a short time. Full details on request—write us.

Consolidated Car-Heating Co.
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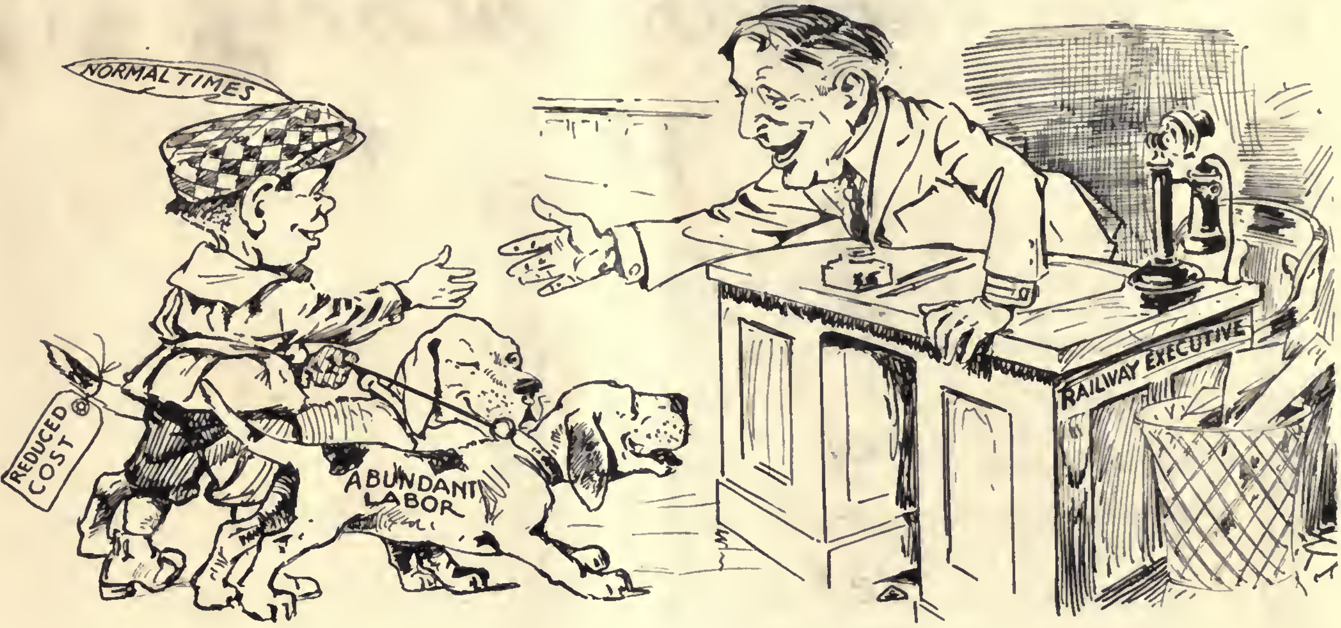
Thermostat

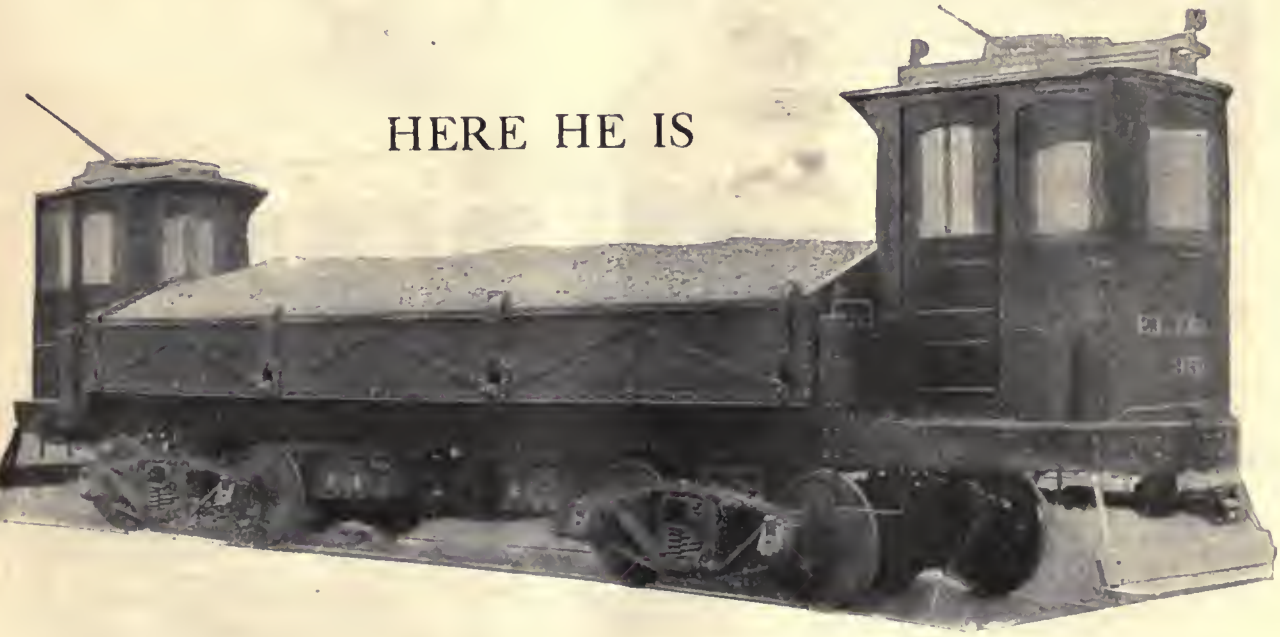
Welcome Little Stranger



The return of Normal Times means opportunity to do your track work and make up deferred maintenance in an economical manner.

The hardest worker and money saver you can get is DIFFERENTIAL CAR.

HERE HE IS



THE DIFFERENTIAL STEEL CAR COMPANY

H. FORT FLOWERS, *Pres. & Gen. Mgr.*
FINDLAY, OHIO

BOUND BROOK BUSHINGS

for the Safety Car—

The Safety Car saves time and labor in maintaining service. Bound Brook Oil-less Trolley Wheel Bushings save time and labor in maintaining the car in service.

They have a self-contained lubricant that never gives out.

Regardless of speed, regardless of attention, they are always lubricated.

On those Safeties, the elimination of loose chattering trolley wheels, the attainment of perfect transmission and the reduction of burnt shunts and other harp troubles means safety and security.

Save time—save man power—insure perfect running, long wearing trolley wheels with Bound Brook Graphite and Bronze Oil-less Bushings.

BOUND BROOK OIL-LESS BEARING CO.
"Specialists in the manufacture of Oil-less Bushings for more than a third of a century."
Bound Brook, New Jersey
Detroit Office: 1723 Ford Bldg.

∫ ∫ ∫ the Best Year we have ever had

THE YEAR just closed has been the best we have ever had. To all of you, our friends in the electric railway field, who have made our increasing prosperity possible, we wish to express our sincere gratitude. We hope we may continue to serve you in the future as we have in the past.

We want you to feel free to call upon us for service at any time. TULC has always been a "Quality First" product. It always will be. And Universal Service will continue to be on a par with the excellence of TULC.

"Let us work with you to help 'TULC' work for you."

The **Universal Lubricating Co.**

Offices:
Schofield Bldg.

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CLEVELAND, OHIO

TULC
A
LUBRICANT

—scientifically and accurately compounded to reduce lubricating costs

Carload after Carload

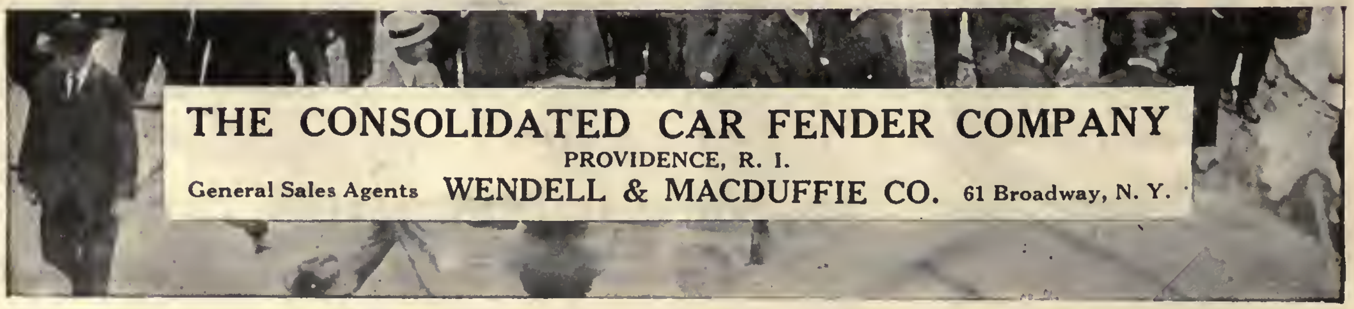
Carload after carload of safeties are leaving the car builders' shops and in practically every case they're H-B Life Guard equipped.

Accident Situation Improves

The trend of accidents, according to the latest census figures, shows that during 1907, 3,086,919 passengers were carried on street cars per one person killed, while in 1917 the number of passengers carried per person killed was 4,393,572. Expressed in percentage, the electric railway hazard decreased approximately 33 per cent. during 1917 as compared to 1907.

Now, is it any wonder that carload after carload of safeties are leaving the car builders' shop H-B equipped?

H-B Life Guard, the last word in making the safety car safer.



THE CONSOLIDATED CAR FENDER COMPANY
PROVIDENCE, R. I.
General Sales Agents WENDELL & MACDUFFIE CO. 61 Broadway, N. Y.

The World's best Lubricants

1869—1921

The Tests of Time

Day after day, month after month, and year after year, *Galena Oils* have demonstrated their efficiency on American railways by faithful and satisfactory service.

The performance record of these oils is an open book, that may be read in the experience and reported figures of Electric Railways in every state of the Union.

The year of 1920 has added to this illustrious record many instances in which these master lubricants have proved their superiority by service tests on cars and in power houses.

The year 1921 finds Galena Service at its highest point of efficiency, with exceptional resources for conserving the customer's interests, and ever ready to show by actual test the advantages accruing from the use of the scientific methods of lubrication perfected by this company.

When Galena Service Goes In!
Lubrication Troubles Go Out!

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THE GALENA-SIGNAL OIL CO.
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Offices in all principal American Cities
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GALENA SERVICE

This is just a corner of one of the Erie Works Storerooms where G-E Coils for G-E Motors are stored for immediate shipment.

G-E Coils From Stock

Haste is no longer an excuse for failing to maintain the "original equipment quality" of G-E motors. Coils made for the very motor you have can be shipped on short notice from the centrally located G-E plant at Erie, Pa. These stocks, though moving rapidly, are maintained complete for the convenience of customers. No coil made is as good for a G-E motor as a G-E coil.

Maintain

"Original Equipment Quality"

General Electric Company

General Office
Schenectady, N.Y.

Sales Offices in
all large cities

40-38

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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Volume 57 New York, Saturday, January 15, 1921 *Number* 3

Pay-Leave Fare Collection Appeals to Safety Engineer

STILL another advocate of the pay-leave plan of fare collection so successfully used on various electric railways has come to the front. It is none other than the local director of the National Safety Council in Kansas City, Mo., who is at present urging the abandonment of the Beeler plan of handling cars in the downtown districts of that city.

While we are not going to take sides with him in the question of handling traffic, we do feel that this is an opportune time for many electric railway operators to consider strongly that, by the pay-leave plan on outbound trips and the pay-enter plan on inbound trips, they can materially increase the track capacity and they will greatly benefit their patrons in enabling them to reach their destinations and homes more rapidly than when both directions of travel are handled strictly on the pay-enter plan.

Another Debt the Industry May Owe to Franklin

NEXT week is national Thrift Week, which begins on Jan. 17, Benjamin Franklin's birthday. The plan has received the approval of a number of national organizations, and the Governor of New York State has just issued a proclamation asking all citizens to observe the week in honor of Franklin, not by ceasing work, but by following his precepts on thrift; in fact, a movement is on foot to have each year a thrift week beginning on Jan. 17.

A campaign in favor of thrift can well be encouraged in this country, not on the theory that Americans have become greater spenders than formerly, but because a great deal of property was destroyed during the war and, broadly speaking, that amount will have to be replaced by savings before the credit and financial structure of the world will become normal again. The subject also is one closely related to the prosperity of the electric railways and the service which they can render to the public, because of the needs which the utilities have for additional funds each year to take care of their maturing obligations. Moreover, as was shown last week, this money will have to come largely from small investors, because with the present income tax laws, individuals and estates with large incomes are seriously penalized if they hold securities other than those which are tax exempt. The extent of this demand for investment funds by electric railways is indicated by a table of electric railway securities maturing during 1921, published in the *Wall Street Journal* last week. This table was included in the last issue of this paper and gave a total for electric railway bonds and notes maturing during 1921 of $207,617,530. Even if most of the savings from thrift campaigns do not go directly into utilities they will help their refinancing if they add to the amount of investment capital of the country.

Thrift campaigns should not be considered in any way to be antagonistic to campaigns urging people to relieve unemployment by purchasing articles. Money saved and invested is expended just as truly as if spent for luxuries, and its expenditure keeps employed an equal number of men. But there is this difference: It is spent for something productive and thus tends still further to increase the national wealth. Even purveyors of luxuries benefit from a thrift campaign, because ultimately it results in a larger group of possible buyers of the articles which they provide.

Many people do not realize how rapidly money reproduces itself, but in the thrift campaign for war savings stamps and others which have been conducted many interesting facts have been developed. Thus, it has been declared that if $7,000 and its proceeds had been kept continuously invested at 6 per cent from the time of the settlement of Jamestown until now the sum would be equal at the present day to the entire national wealth of this country, public and private. It will be remembered that Benjamin Franklin bequeathed a sum of money each to Boston and Philadelphia which was to be put at compound interest and then, with the accumulation, be put to the service of the public at the end of a century. While the actual amounts accumulated fell short of his calculations, the citizens of both cities are today enjoying the benefits of his forehandedness. If the memory and maxims of Benjamin Franklin will encourage efforts of this generation to thrift it may constitute another contribution by him to the electrical industry comparable with that which established the identity of lightning and electricity.

The Scrap Pile an Index of Progress

A REPRESENTATIVE of this paper asked one of the electric railway visitors from abroad last fall what most impressed him in regard to the operating practice of electric railway companies in this country. The visitor, who had made an extensive tour of inspection of different electric railway properties, promptly replied: "The size of their scrap piles." He then explained that he spoke both literally and figuratively and that what he had in mind was the amount of apparatus and equipment discarded as unfit for use by electric railway companies. Some of this was literally thrown on the scrap pile, but all was disposed of as scrap. In view of the more frugal practice observed by electric railway companies on the other side of the Atlantic, such a policy appeared to him to be almost criminal waste.

Much of this scrapping of material, in the opinion of the speaker, was due to lack of proper maintenance. Cars, for instance, would be used up in one-half or one-third of the time they would last abroad, principally because proper attention had not been paid to keeping up the paint and varnish and other protection. Still other cars which were in good condition would be discarded because "they were out of fashion." Equipment parts would be thrown on the scrap heap because no one seemed to think it worth while to rescue them, and so on down the list.

The fault of waste is one which is often charged against America, but is the practice just mentioned really waste? In fact, are not the enterprise and real efficiency and economy of our railway managements often gaged directly rather than inversely by the size of their "scrap heap"?

It may at first sight, for instance, seem wasteful to neglect the maintenance of a car body, but if there were perfect maintenance, car bodies would last indefinitely except for those destroyed by collisions. Yet car design is a progressive science, and if the physical life of a car body is longer or very much longer than its life as dictated by the existing status of car design, no great good is obtained.

Of course, the same principle applies to equipment parts and apparatus. There are doubtless instances where both have been scrapped too soon, but we believe the number of instances is far larger where they have been scrapped too late. This is especially the case with complete apparatus and equipment. On too many roads obsolete motors have been kept in operation long after they should have been thrown on the scrap pile because of their high maintenance cost and inefficiency. The wise manager is the one who knows the best time to throw away equipment and then acts upon his convictions. Some years ago this paper suggested as a slogan embodying the above principle the phrase, "Don't Build Cars to Last Forever." If cars are not built to last forever, obviously they and their component parts must be discarded some time.

Engineers' Program for 1921 Activities Promises Hard but Effective Work

THE members of the Engineering Association look to the subject committee each year to scan the field so closely as to permit the drawing up of a program which is comprehensive and interesting. The planning of this program is really one of the most important jobs of the association year. When it has been approved by the association and revised by the executive committee it forms a rather rigid guide for the committee work. The presumption that the topics selected are the most important ones for study is a fair one on the part of the committee members. They assume that if they carry out the assignments made to them they are doing their best work for the association. The list of 1921 assignments was printed in the Dec. 25 issue of this paper, page 1296, and its several sections ought to be studied carefully by the specialists in the respective fields.

In examining critically a list like this, one naturally takes the point of view of the committee members, who must do the assigned work and prepare acceptable reports. One asks, in this connection, is the work necessary and will it be inspiring? Most committee work is necessarily tedious; in fact one of its purposes is to relieve the industry as a whole from the task of collecting and digesting data, and similar duties. Hence it is natural to expect that the preparation of a report will be more or less of a "grind." But there should be some inspiration in it, too, if the best results are to be had. From these standpoints the 1921 assignments appear to be satisfactory. The numbers of topics in the several groups are not large, and in each there is at least one highly attractive topic. For example, the building and structures committee is to work on a shop layout; the equipment committee is to report on the life of wearing parts and related topics; the heavy traction committee is to compare the operation of locomotive and multiple-unit train operation; the power distribution committee will study wear of overhead contact conductors; the power generation committee will bring up to date the subject of the automatic substation, and the committee on way matters will consider substitutes for wood ties. There is also a new committee on apprentice systems which ought to stir up something at the next convention.

As the committees take up their work, it is appropriate that attention should be directed to the principles outlined above. The committees will need the co-operation of the entire industry in their researches. If the commissions which have been given to the committees are faithfully carried out, the 1921 convention of the Engineering Association will set a new high mark for excellence.

Connecticut Starts to Apply Federal Commission Findings

THE special report of the Connecticut Commission on the electric railway situation in Connecticut, of which an extended abstract was presented last week, shows that the commission has spared no effort to bring out the facts of the case and to apply to the local conditions the financial features of the recommendations of the Federal Electric Railways Commission. The commission has struck two ways. In its functions of securing for the public adequate service at reasonable rates, it admonishes the company in no uncertain terms. More strongly perhaps, it speaks to the public, or Legislature, in telling it what it must do in order to assure itself of the service at rates which it desires to pay and also in order adequately to pay for the service, provide for a return on the investment and assure credit upon which extensions and improvements may be based. Above all, it urges a spirit of co-operation, understanding and fair play.

An outstanding suggestion is to the federal court, to the effect that it restore the Connecticut Company to the New Haven road, which had originally created the property in a desire to link together in an economical operating unit the various transportation agencies of southern New England. That the community has not gained by this disintegration seems apparent to the commission.

To the company the commission recommends the sound policy of operation by independent divisions under competent local managers who have the necessary authority. It suggests the use of motor vehicles as substitute transportation on non-paying lines and as auxiliary to existing lines. It recommends increased publicity and suggests certain service improvements, which are probably sincerely desired by the company as well, as soon as its funds can support them.

To the public, the commission urges the abolition of many taxes and imposts, now proving a burden and reflected in poorer service and higher rates to the public. It suggests that legislation be enacted allowing the abandonment of unprofitable lines and permitting the railway company to operate motor vehicles. And most important, in this State of much jitney experience, it suggests that jitneys be made common carriers, subject to the control of the commission, except for certain safety and license rules of the State's motor vehicle department.

While the company's management may not care for some of the inferences and direct statements in the report and while the public may be slow to recognize the correctness of some of the admonitions directed its way, yet the report gives an impression of sound common sense. One is particularly struck by what might be called the commission's outstanding sanity in the question of valuation. While details of methods employed must be awaited before competent comments may be made, the logic of the commission in arriving at a conclusion at a cost of $10,000 as compared with a minimum estimated expense of $100,000 if the usual method has been followed seems unassailable, provided, of course, that an essentially correct result has been obtained.

Connecticut's new engineer-lawyer Governor, E. J. Lake, in an independent message, has closely paralleled the suggestions of the commission, in principle if not in detail.

It is, of course, too early to predict the form of any actual legislation which will result, but these recommendations in Connecticut, where electric railway and jitney troubles are serious, indicate both that there is action pointing toward constructive utility legislation, as has been anticipated in these columns, and that the report of the Federal Electric Railways Commission is taking effect in concrete form.

Educating the Man on the Job

TO GET the maximum efficiency from the men directly responsible for electric car maintenance requires that these men have a general knowledge of the functions which the various parts of the equipment are expected to perform and of the methods used in calculating and checking dimensions and adjustments. Most brake repair men will immediately concede the advantage of having the same shoe pressure on each pair of wheels during the braking period. In practice they find unequal shoe wear occurring continually, but if asked to check up their equipment and determine the pressure they are actually getting, few could do it. Such questions as the relation which unequal shoe clearance, excessive piston travel and high leverage bear to the frequency with which inspection and adjustment must be made will be better appreciated if the men can follow out some of the fundamental calculations of brake-rigging design on their own equipment. At first thought this problem may appear rather difficult, but a little consideration shows that in reality it is very simple and can be readily understood without the use of complicated mathematical formulas.

An article in this issue, which is the first of a series by H. M. P. Murphy, takes up some of the elemental considerations of brake-rigging calculations. Articles which are to follow will apply these to the most common types of brake rigging found on electric cars. These calculations are presented in a manner that can be readily understood by the average car repairman and should prove of educational value to the men most closely connected with the work if this information is made available to them. On account of the differences in car construction and weight there can be no fixed standard as to levers, but foremen and their assistants should be interested in informing themselves as to methods of making easy calculations. A little study and analysis will show many minor details in maintaining foundation brake rigging which would, if neglected, lead to serious accidents, or at least to a decrease in the efficiency of the braking equipment.

Customers' Notions Sometimes Make Supplies Cost More

THE contention of the standardization "fans" is that non-standard equipment will in the end cost more. If a reasonable number of companies adopt association standards this will prove true. There is a real drift or movement now in this direction. An element in the situation is the willingness of purchasers to suppress their desire for individuality for the good of the treasury.

Time was when every designer of electric railway apparatus wanted his designs to be different, thus stamping his individuality and personality upon his work. Not being quite satisfied with what he found ready to his hand, he got up something which he thought a little better. This of course was a special product for which his employer had to pay extra. This condition prevailed from a trolley hanger to a power plant.

This craving for individuality was opposed to manufacturing economy, often because the offender was not familiar with manufacturing processes. The present committee make-up of the Engineering Association, with railway and supply engineers on the same footing, is having an excellent effect, among others, in educating operating men as to these processes.

In last week's issue of this paper an article was printed which emphasized the above-mentioned point, but with regard to steel poles. It gave the manufacturer's point of view as to this important product. The careful reader was undoubtedly impressed by the fact that many considerations enter into the selection of details of design of steel poles, and other things, which are apt to be overlooked altogether. Presumably the salesman points these out when specifications are handed to him, but the salesman is hardly in a position to dictate or even urge a change in specifications when he is competing for an order. It is really up to the purchaser to know what he wants, and he ought to want what can be had most economically. In other words, the less notional he is the better.

Quotation from the Federal Electric Railways Commission Report

No. 3

ELECTRIC railways were not conservatively financed in their early years, and have not since made good their overcapitalization, except to a limited extent, otherwise than through the process of bankruptcy and reorganization. In the early days the promoters of electric railway properties believed that the long-term franchises with a 5-cent fare would be permanently profitable. Large sums of money were required to develop the business. In many cases the promoters issued bonus stock to represent money, service or property and added nothing to the value of the plant. As a result of this practice, there are many cases where the existing capitalization exceeds the investment in the plant or the value thereof, and there has been neglect to amortize this excess capitalization.

The Force Action of Brake Riggings

Most Common Forms of Levers Used in the Brake Rigging of Electric Cars Are Described and the Fundamental Laws of Leverage Are Worked Out and Applied to Practical Installations—By Solving Several Problems Involving the Forces Acting at the Various Points of Levers Those Interested Can Become More Familiar with the Subject

BY H. M. P. MURPHY

IN ALL brake systems economy and other practical considerations require that the force exerted by the brake-cylinder piston, or other source of power, be multiplied many times before being delivered to the brake shoes. Consequently the most important parts of any brake rigging are the devices which do the multiplying work and which are ordinarily simple levers or their equivalents. In dealing with this subject one of the fundamental requirements that must always be fulfilled in any satisfactory design is that each lever shall have only three independent parallel forces acting on it at the same time. If an attempt be made to cause four or more independent forces to act on a lever at the same time perfect equalization is no longer possible in practice and can only be obtained in part by the use of springs. On this account, and because the use of such devices offers no advantage whatever, the three-point lever has become the universal standard and is the only one that will be discussed here, although the same fundamental principles are applicable to all types of levers.

ELABORATE and costly experiments have been made to secure braking efficiency, braking power has been calculated to a nicety and everything possible has been done to insure proper installation of brake equipment, yet the results obtained ultimately depend on the thoroughness with which adjustments are made and the mechanical relations maintained. The most careful designing may be upset by such small items as the position of a brake lever, wrongly applied or missing cotter pins, holes worn oblong in brake levers, excessively worn brake lever pins or wrongly applied levers. Proper maintenance requires that careful attention be given to checking brake leverage, and foremen and their assistants should be posted on easy methods of making calculations. With this object in mind the editors of this paper have arranged for a series of articles on brake rigging design and calculation, the first of which is published herewith. The studies presented will be given in as simple and fundamental a manner as possible so that the whole subject may be more fully understood by the men actually doing the work. H. M. P. Murphy, the author, has had a long and varied experience in the calculation, installation and operation of braking systems with the pioneer company on brakes, the Westinghouse Air Brake Company, and the information which he presents should be of value to the mechanical departments of electric railways.

DEFINITION OF A LEVER

Whenever the generally accepted term "lever" is used it refers to a rigid bar, either straight or curved, which is so designed that it may be acted upon by three parallel forces in such a way as to produce a balance between them and to cause them to bear any desired relation to each other.

There are two kinds of three-point levers, namely, "straight line" and "eccentric." These will be taken up and described. The most common form of lever is a flat steel or iron bar, with three holes drilled in it in the same straight line, as shown in Fig. 1, the forces being transmitted by pins run through the holes and fastened in the jaws of rods or brackets. This type of lever is called the "straight-line" lever. At times a slight modification of the straight-line type of lever is employed, as illustrated in Fig. 2, one of the end holes being replaced by a semicircular notch or a curved bearing surface, as indicated. With this type a hooked jaw or a slotted head transmits the force to the end thus designed, instead of through a pin, as in the case shown in Fig. 1. Occasionally levers of the straight-line form are bent into various shapes in order to clear some obstruction. Such a lever is shown in Fig. 3.

The eccentric form of lever differs from the straight-line type only in that the three pin holes or bearing points are not in the same line, as illustrated in Fig. 4. This type of lever is not generally desirable from a practical point of view and should never be used when it is at all possible to avoid it. The object of bending a lever in this way is to provide clearance where necessary.

The simple principles or physical laws which govern the action of all levers, and similar force-multiplying devices, are in reality self-evident facts and therefore require no elaborate proof. Before stating these laws in a broad sense it will, however, be well to illustrate them by aid of a few elementary examples: Thus in Fig. 5 let a straight-line lever be suspended at the middle point by a cord passing over a pulley and suppose that the weight of the lever itself is neglected; then if a 100-lb weight be hung at one end, 20 in. from the central point, the lever will be balanced if another 100-lb. weight be hung on the opposite end at the same distance from the center end if two 100-lb. weights be attached to the cord.

Again, suppose that a 100-lb. weight is suspended on a lever, as in the previous case, at 20 in. from the central point. Now the lever may be perfectly balanced, as shown in Fig. 6, by hanging two 100-lb. weights on the opposite end at 10 in. from the central point (*i.e.*, at one-half of the single weight distance from the central point) and by attaching three 100-lb. weights to the cord.

As another example, suppose that a 100-lb. weight is suspended on a lever, as in the preceding cases, at 20 in. from the central point. Now the lever may be perfectly balanced, as shown in Fig. 7, by hanging four 100-lb. weights on the opposite end at 5 in. from the central point (*i.e.*, at one-fourth of the single weight distance from the central point) and by attaching five 100-lb. weights to the cord.

In any of these examples it is equally true that the same weights or forces will remain in balance if the lever be swung about the central point at any angle; thus, the same relations between the weights indicated in Fig. 6 will be maintained if the lever be swung at the angle shown in Fig. 8, the weights all acting vertically; that is, in parallel lines.

By an inspection of Figs. 5 to 8 it is seen that the two end forces acting on a lever are always exerted in the same direction, which is opposite to that of the central force. The examples illustrated also show that the middle force is always equal to the sum of the two end forces. Thus in Fig. 6 the middle force is 300 lb., which is equal to the sum of the two end forces of 200 and 100 lb. respectively, and either end force is equal to the middle force minus the other end force. Thus in Fig. 7 the force acting on the short arm is 400 lb., which is equal to the middle force of 500 lb. minus the other end force of 100 lb., or, the force acting on the long arm is 100 lb., which is equal to the central force of 500 lb. minus the opposite end force of 400 lb.

A Fulcrum is Defined

In dealing with levers of any type or with other force-multiplying devices, such as locomotive bell cranks, it is customary to consider one of the three points or pin centers as the center about which the lever turns. A point thus considered is called the fulcrum. It is often thought that the fulcrum should be a fixed point, but this idea is entirely wrong. On the contrary, it should be emphasized that no matter what may be the duty of a lever or whether it has a fixed center or not any one of the three points (or pin centers) may be considered as the fulcrum. By remembering this important fact the problems of figuring leverage is reduced to one of extreme simplicity, and, as will be shown later, one single rule may be used for finding the forces acting on any lever.

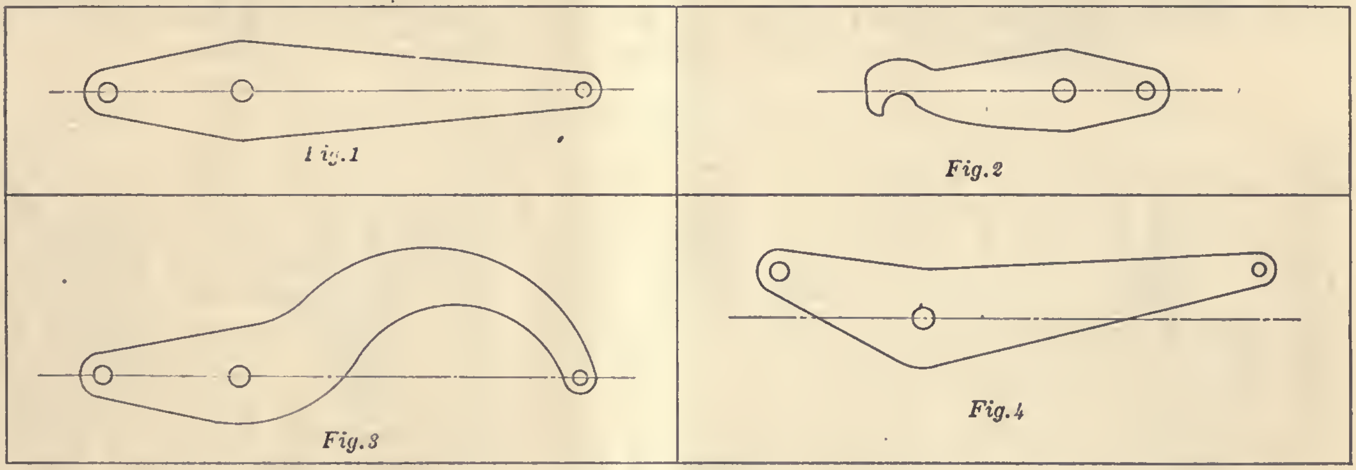
Fig.1

Fig.2

Fig.3

Fig.4

COMMON TYPES OF THREE-POINT LEVERS

Fig. 1—Straight-line type of lever. Fig. 2—Straight-line type with hooked jaw. Fig. 3—Straight-line type bent to provide clearance. Fig. 4—Eccentric type of lever.

In the case of any straight-line lever the distance between the point of application of a force and the point considered as the fulcrum is called the lever arm of the force in question. When any one of the three points of a lever is considered as a fulcrum the forces acting at the two other points are so related to each other and to their lever arms that the product obtained by multiplying either force by its own lever arm is always equal to the other force multiplied by its lever arm. Figs. 5, 6, 7 and 8 illustrate this. For example, in Fig. 6 or Fig. 8 consider the left-hand point of the lever as the fulcrum. Then by applying the law in question it is seen that the product obtained by multiplying the middle force, 300 lb., by its lever arm, 10 in., is 3,000, which is equal to the product of the right-hand end force, 100 lb., by its lever arm, 30 in.; or, in the same figures, consider the middle point of the lever as the fulcrum, then it is also seen that the given law applies, for 200 × 10 = 2,000, which is equal to 100 × 20 = 2,000; also, by considering the right-hand point of the lever as the fulcrum it is seen that the same law again applies, for 200 × 30 = 6,000, which is equal to 300 × 20 = 6,000.

Forces Developed by Straight-Line Levers

In order to obtain a direct method for determining the forces developed by any straight-line lever it is apparent that the law may be given as follows: If any one of the three points of a lever be considered as the fulcrum and if either one of the forces acting at the two other points be multiplied by its own lever arm and this product be divided by the lever arm of the second force the result obtained will be equal to the second force.

This method may be illustrated by Figs. 5, 6, 7 and 8. For example, consider the lever shown in Fig. 7 and suppose that the right-hand point is assumed to be the fulcrum. Then by multiplying the left-hand force, 400 lb., by its lever arm, 25 in., and dividing the product, 10,000, by the lever arm, 20 in., of the middle force the result is seen to be equal to 500 lb., the middle force. Similarly, if the middle force of 500 lb. be multiplied by its lever arm, 20 in., and if this product, 10,000, be divided by the lever arm, 25 in., of the left-hand force the result is seen to be equal to 400 lb.; that is, the left-hand force. Again, suppose that the middle point be considered as the fulcrum. Then if the right-hand force of 100 lb. be multiplied by its lever arm, 20 in., and if this product, 2,000, be divided by the lever arm, 5 in., of the left-hand force the result is seen to be equal to 400 lb.; that is, the left-hand force. Consequently it is clear that the truth of the law, or principle, under consideration holds for any case whatever, and, therefore, that in order to compute the forces acting on any three-point lever it is merely necessary to remember this law, which, for convenience, will be called the "leverage rule" and which may be restated in the following concise form: When the force applied at one point of a lever is known and it is desired to find the force developed at (*i.e.*, acting at) either one of the two other points consider the third (*i.e.*, remaining) point as the fulcrum. Then the desired force may be found by multiplying the known force by its own lever arm and by dividing this product by the lever arm of the desired force.

The lever point (or pin center), which is to be considered as the fulcrum in any specified case, is, of course, the point at which neither the known nor the desired forces act; that is, in order properly to select the "fulcrum" note the points of application of the known and desired forces. Then the third or remaining point should be considered as the fulcrum.

EXAMPLES OF THE LEVERAGE RULE

To illustrate the use of the leverage rule consider a lever of the type and size shown in Fig. 9. Suppose that a force of 3,000 lb. is applied at the lower end point as indicated and let it be required to find the force developed at the middle point. Consider the upper end point as the fulcrum. Then by the rule, which for simplicity may be expressed in the following mathematical form:

The desired force =

$$\frac{\text{(the known force)} \times \text{(the lever arm of the known force)}}{\text{the lever arm of the desired force}}$$

As in this case the middle force is the desired force and the lower end force is the known force, and also as the lower end force = 3,000 lb., the lever arm of the lower end force = 25 in. and the lever arm of the middle force = 15 in., the mathematical calculation is obtained from:

$$\text{The middle force} = \frac{3{,}000 \times 25}{15} = 5{,}000 \text{ lb.}$$

In the same manner the force developed at the upper end point may be found by considering the middle point as the fulcrum, thus:

$$\text{The upper end force} = \frac{3{,}000 \times 10}{15} = 2{,}000 \text{ lb.}$$

Now as a check on these computations the two end forces added together must be exactly equal to the middle force. This is seen to be the case, for 3,000 + 2,000 = 5,000.

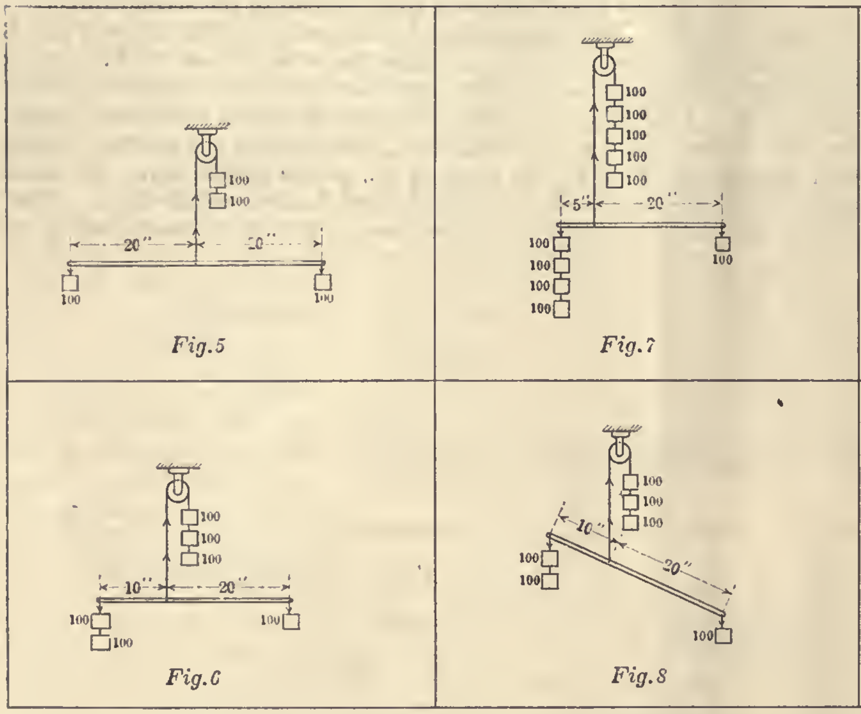

Fig. 5 Fig. 7 Fig. 6 Fig. 8

DIAGRAMS ILLUSTRATING LAWS OF LEVERAGE

Fig. 5—Lever suspended at middle point.
Fig. 6—Lever suspended at point with weight distances of ends in ratio of 1 to 2.
Fig. 7—Lever suspended at point with weight distances of ends in ratio of 1 to 4.
Fig. 8—Lever swung through an angle.

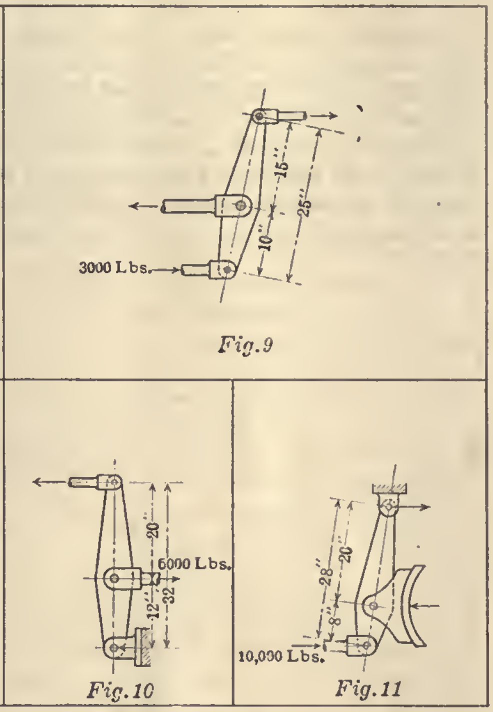

Fig. 9 Fig. 10 Fig. 11

COMMON FORMS OF BRAKE LEVERS

Fig. 9—Live cylinder lever.
Fig. 10—Dead cylinder lever.
Fig. 11—Brake hanger lever.

As a further example of this method of calculation consider a lever of the type and size shown in Fig. 10. Suppose that a force of 6,000 lb. is applied at the middle point, as indicated, and let it be required to find the force developed at the upper end point. To solve this problem consider the lower end point as the fulcrum and then, by the mathematical expression previously given:

The desired force =

$$\frac{\text{(the known force)} \times \text{(the lever arm of the known force)}}{\text{the lever arm of the desired force}}$$

$$\text{The upper end force} = \frac{6{,}000 \times 12}{32} = 2{,}250 \text{ lb.}$$

Also to find the force developed at the lower end point consider the upper end point as the fulcrum. Then by applying the rule,

$$\text{The lower end force} = \frac{6{,}000 \times 20}{32} = 3{,}750 \text{ lb.}$$

Now as a check on these computations the two end forces added together must be exactly equal to the middle force. This is seen to be the case, for 2,250 + 3,750 = 6,000.

A still different but similar application of this may be had by considering a lever of the type and size shown in Fig. 11. Suppose that a force of 10,000 lb. is applied at the lower end point, as indicated, and let it be required to find the force developed at the upper end point.

Consider the middle point as the fulcrum. Then by applying the mathematical rule previously given:

$$\text{The upper end force} = \frac{10{,}000 \times 8}{20} = 4{,}000 \text{ lb.}$$

Also to find the force developed at the middle point consider the upper end point as the fulcrum. Then:

$$\text{The middle force} = \frac{10{,}000 \times 28}{20} = 14{,}000 \text{ lb.}$$

Now as a check on these computations the two end forces added together must be exactly equal to the middle force. This is seen to be the case, for 10,000 + 4,000 = 14,000.

IMPORTANT FACTS CONNECTED WITH THE USE OF THE LEVERAGE RULE

The important facts which have been illustrated by the preceding examples may be summarized as follows: First, any one of the three points or pin centers of a lever may be considered as the fulcrum whether there is a fixed point or not; second, in the computation of one of the two unknown forces acting on a lever the point at which the other unknown force acts must be considered as the fulcrum, and, third, each of the unknown forces acting on a lever may be found by aid of the "leverage rule," providing that the point considered as the fulcrum is properly selected in each case and that the lever arms of the desired and known forces are correctly measured in accordance with the fact that for straight-line levers the lever arm of any force is the distance between the point of application of the force and the point considered as the fulcrum.

It is now evident that by remembering the simple but general "leverage rule" and the true significance of the terms "lever arm" and "fulcrum" the forces developed in any standard form of brake rigging may be easily computed, for all of such systems are composed of a series of simple levers connected by suitable means, such as tie rods, etc., for transmitting the forces concerned. The usual method of procedure employed in the solution of brake rigging leverage problems will be fully explained in the following articles.

The Inspection of Rail Bonding

Inspectors Must Make Certain that All Joints Are Bonded, that Proper Types of Bonds Are Used, that Rails Are in Proper Condition for Bonding and that the Work Is Done Satisfactorily —Analysis of the Methods to Be Employed to Achieve the Desired Results

BY G. H. MCKELWAY
Engineer of Distribution Brooklyn (N. Y.) Rapid Transit Company

NO MATTER how good a rail bond may be immediately after installation, there is no type that can be relied upon to remain in good condition indefinitely. It is therefore important that they be inspected and tested periodically in order that those that deteriorate may be removed and be replaced with good ones. Some railway companies, particularly those whose tracks are laid and bonded by contractors, have inspectors on the work during the time of installation to see that the bonds are applied properly and also have tests of the bonds made as soon as they are installed. Where concealed bonds are being installed by contract such inspectors are often needed to make certain that the bonds are installed at all. Even if the contractors in charge of the work are entirely honest and furnish enough bonds for all joints, yet the men whose duty it is actually to install the bonds may not put all of them in, either through carelessness, laziness or dishonesty.

The first duty, and the most obvious one, of such an inspector therefore is to see that all of the joints are bonded. The next is to see that the proper type and length of bond is used, and then to make sure that all bonds are applied in such a manner as to make good contact with the rail and to insure that they will remain in good condition as long as possible.

First the rail should be properly prepared to receive the bond terminal. If expanded terminal bonds are to be employed holes of the proper size should be drilled in the rail at the proper height and the right distance apart. The height of the hole may seem unimportant, but if it is not in just the right place the bonds may be pinched between the splice plate and the web of the rail where the bonds are installed under the plates. At best there is very little room for the bonds under many of the plates, and a slight variation in the location of the bond may easily place it where the joint plate will squeeze it when the bolts are drawn up tight. The holes themselves should be drilled with well-sharpened bits so that the metal will be cut out cleanly and not torn out raggedly so as to leave burrs in the hole.

The question as to whether or not any lubricant should be used when making the holes is still an open one, although it has been debated for many years. The consensus of opinion seems to be that it is safe to use a lubricant if proper precautions are taken to insure its removal after the drilling has been finished. But the supporters of the use of a lubricant are divided as to whether plain water, soda water or oil should be used.

MOISTURE WILL CAUSE RUST

The objection to the use of water is that any moisture left in the hole will cause rust, which is an insulator. The contact between the terminal and the sides of the hole is imperfect and the resistance is increased not only at the point where the original rusting occurred but utlimately at other points to which the corrosion may extend. Oil is also an insulator, but it is claimed that all but a very thin film of it will be pushed out of the hole when the bond terminal is inserted and expanded. The excess oil, however, when driven out of the hole will gather around the edges and will stay between the head and button of the terminal and the web of the rail, thus reducing the conductance between those parts. To make a really good job all of the water or oil should be wiped off before the bonds are installed and this is too much to expect from the ordinary class of bonding labor in the field, so that the safest way is to drill the holes dry.

Not only must the inspector be on guard against any moisture that might be introduced into the hole during the act of drilling, but precautions should be taken to make certain that no dampness from the atmosphere or from any other source may enter later. To this end no bonding should be done during rainy weather, and even on clear days the bonds should be installed in the holes as soon as possible after the latter have been drilled. When holes are drilled on one day and the bonds are not installed until the next it is sometimes the practice to plug the holes with paper to exclude the dampness. This is better than nothing, but the best plan is to run a reamer through the holes the next morning, taking off only enough metal from the sides of the holes to be sure of removing any corrosion that may be present.

After the terminals have been placed in the holes the inspector should satisfy himself that they have been sufficiently expanded. With tubular terminals there is little to watch except to see that the taper punch is used in accordance with the instructions and that the drift pins are driven home. In the installation of compressed terminal bonds the compressors must be in good condition, well greased, and with screw threads, pins or cups unbroken and well centered in the bond terminals, and sufficient force must be exerted by the bonders to make sure that the bonds are well compressed. Where hydraulic compressors are used it is much easier to obtain satisfactory compression than with the screw type, as the former do not require the bonders to exert as much strength in their operation as do the latter.

The screw compressors are generally used on all but large jobs because of their low first cost and lighter weight. If the screw compressors are well made and operated they can turn out as satisfactory work as the hydraulic type and will compress just as much. That this is true will surprise many persons, but it was proved by a competitive test made by a large railway company a few years ago. The saying of Archimedes, that given a lever long enough he could move the world, can be adapted to the screw type of compressor. By using a long enough wrench and particularly if a ratchet wrench is used, so that it can be made to take hold of the screw at the angle best suited for the application of power by the men operating it, sufficient power can be supplied to give any compression needed. In fact, that can be furnished by two husky men on the end of the ordinary wrench if they are only willing to work hard.

POLISHING INSURES GOOD CONTACT

Another point that is always recommended but which is seldom carried out in practice is the polishing of the bond terminals with emery cloth before they are installed in the holes. This polishing is to make sure of good contact between a clean, bright terminal and the clean sides of the hole. Mercury amalgam is occasionally used to make a still better contact, but, although there is a very slight improvement in the contact resistance at the beginning, this is only temporary and the contact cannot be relied on permanently to improve the bonding.

Where soldered bonds are installed the inspector should see that the portion of the rail to be covered by the terminal has been carefully polished, that the terminals are placed on the polished portions of the rail and not partly on the smooth and partly on the rough metal and that the rail and the terminal are sufficiently heated before the solder is applied to them. The rail should be tinned before the bond is clamped in place, and this cannot be done well unless the blow torch has been playing on it for some time. It is easy to heat the terminal thoroughly after it has been put in place, but owing to the much greater amount of metal in the rail and the ease with which the heat is conducted away from the point where it is applied there is always danger that the solder will adhere closely to the terminal but not to the rail and that a poor job will result.

With the various types of welded bonds the same precautions must be taken as with soldered bonds except that there is no necessity for preheating the rail. When a welding car is used, after the welding has been begun it is only necessary to see that the proper pressure is applied to the bond and that the current is kept on for the right length of time. When the bonds are applied by the arc-weld process the operation is not so mechanical and the type and length of the arc, as well as the method of depositing the molten metal, must be watched.

When special work is to be bonded with cable jumpers not only the connections between the terminals and the rail should be inspected but also the connections between the various wires and between the bonding wires and the sections of bonds running to individual pieces of the special track work as well. The inspector should make sure that the splices in these wires are not only well wrapped but also carefully soldered, for unless the work is carefully supervised there will be attempts to make some if not all of these connections with "dry splices," using no solder at all.

TESTING FOLLOWS INSPECTION

After the installation of the bonds has been completed tests should be made to insure that they have been put on properly and are fulfilling the requirements specified. With the welded and soldered bonds these tests are often made by purely mechanical means, the terminals of the bonds are kicked or struck a light blow with a hammer to see that they cannot be easily knocked off. A variation of this method is to slip a bar through the loop of the bond and to use that as a lever in an attempt to pry the bond from the rail. In order that enough but not too much strain may be thrown on the bond it is well to specify the length of the bar to be used and to have the pull exerted at the specified height through a spring balance to measure the amount of the force applied. It is also customary with some companies to pull off a certain percentage of the bonds and examine the terminals to see the extent of the contact made between them and the rails. These few bonds are taken at random and therefore are supposed to represent the average conditions of the whole lot of bonds that are installed.

Mechanical testing will serve no good purpose with the expanded terminal bonds, and although visual inspection will show a few things, such as whether or not the compressor was properly centered on the bond, whether the button was formed properly, and whether any splitting of the terminal took place, yet that is about all, and there is no way, except by testing electrically, to make certain as to the quality of the contact made. As was mentioned by the writer in a previous article, it is extremely doubtful whether electrical tests of recently completed bonding are of any value except to show up bonds that have been very poorly installed or to locate joints where no bonds at all have been placed. The contact resistance between the joint plates and the webs of the rails is so low when the tracks have just been laid and until a film of rust has had time to form between them that a much greater proportion of the current is at first carried by the plates than is the case later, and therefore the bonds appear to be in better condition than they really are. Later tests, however, will produce the desired results.

Arc Welding on Railway Properties*

The Convenience and Economy Resulting from Electric Welding Are Now Recognized Quite Universally by All Railways—New Uses and Practices Are Coming to Light Continually—Some Important Details of the Science of Electric Welding and the Results Obtained Are Related—New Applications for Arc Welding Are Also Pointed Out

By A. M. CANDY
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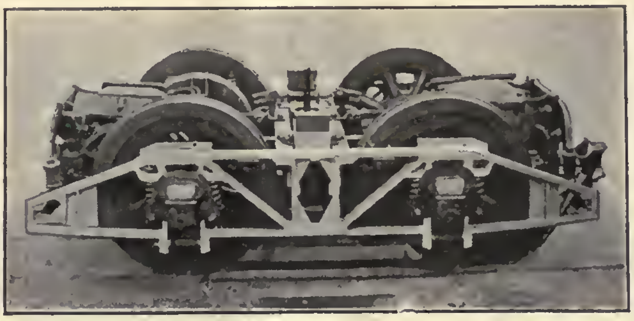
THREE views of three different truck frames which are entirely welded, no rivets being used in their construction, are shown in Fig. 1. This is a practice now being used to a certain extent by the Government Electric Railways of Sydney, Australia. The journal boxes used with these trucks are also made up completely by welding. Another interesting use of arc welding on this property is in making gear cases, as pictured in Fig 2. It will be observed that not only is the shell of the gear case welded but also the reinforcing strips on the sides. The latter are welded by what is known as the plug welding method, wherein metal is deposited in small holes drilled through the outer plate. These places can be identified by the rough approximately circular spots at various locations over these reinforcing plates. A somewhat similar method of welding gear cases is used by some of the large manufacturers here.



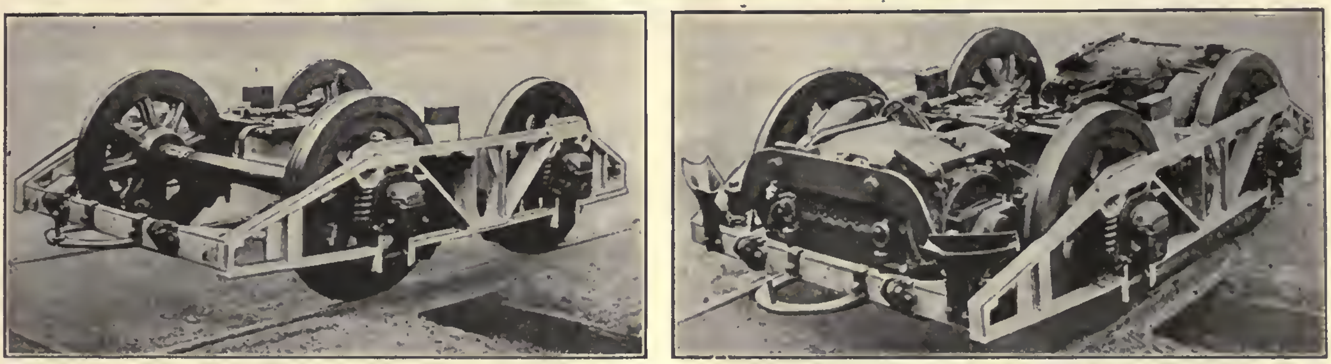


FIG. 1—ALL-WELDED STREET RAILWAY TRUCK USED BY THE GOVERNMENT RAILWAYS, SYDNEY, AUSTRALIA

Fig. 3 shows the bottom of a welded steel transformer tank, which is a good illustration of a welding job that can be done more satisfactorily by the arc process than by the gas process for the following reason: If the gas flame is played against the center of the Z-bars in order to bring them to a welding temperature for welding the bracing strips the bars will become so badly heated that they will buckle up in the center, making it practically impossible to do a satisfactory job. In the case of the arc process the arc heat is so concentrated and the weld can be made so rapidly that the entire joints between the Z-bars and the bracing strips can be made without throwing the Z-bars out of alignment appreciably. This close-up view of the bottom seam shows how uniformly a good operator can put down the deposited metal. Incidentally, this entire case was welded by an operator who had been using the oxy-acetylene welding process for years, but who had only two weeks' training previous to building this particular arc-welded tank.

Fig. 4 shows the method used by one of the pressed steel car builders for attaching the felt lining for the inside of a car body. The positive side of the welding circuit is attached to the car body and the operator, using a pair of pliers connected to the negative side of the circuit, grips finishing nails in the pliers so that he can touch the head of each nail against the side of the car sheeting, drawing an arc. He then pushes the nail into the molten metal thus formed and releases the pliers, leaving the nail attached to the plate as indicated. The felt lining is then pressed down over these nails, after which small circular disks of tin, such as are used for fastening tar paper roofing, are pressed down over the nails. After this has been done the nails are clinched over to hold the lining in position.

In Fig. 5 is illustrated a very neat and satisfactory way of building up the worn surfaces of a standard coupler knuckle. A number of steam railroads are following this practice.

Experience in Welding Undersize Motor Shafts

If undersize motor shafts are reclaimed by welding and turning down to proper size it would appear from superficial observations that this practice is satisfactory. However, if the shaft is cut through the deposited section, as illustrated by Fig. 6, and the section is ground, polished and etched it will be found that the deposited

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*Abstract of address made before Association of Railway Men, Mansfield, Ohio, Dec. 7, 1920.

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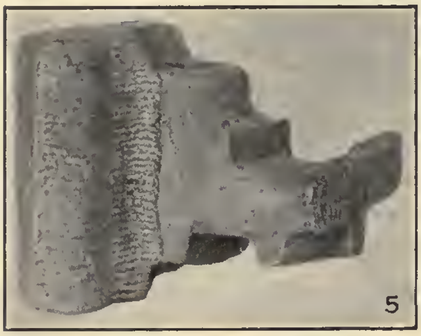
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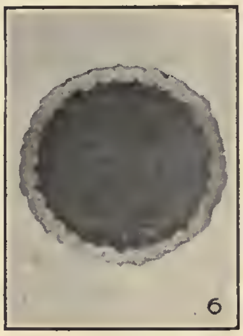
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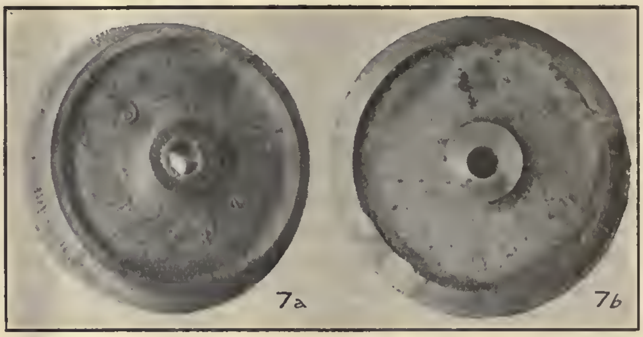
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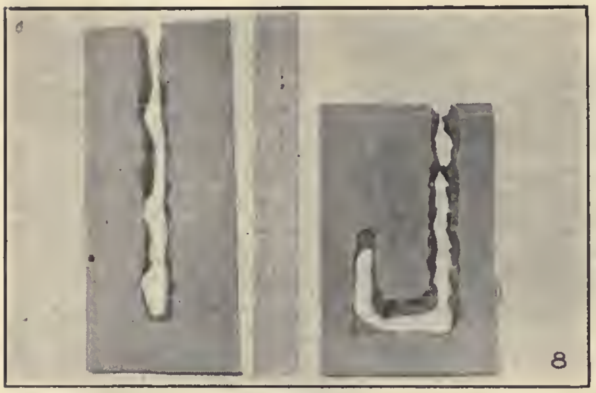
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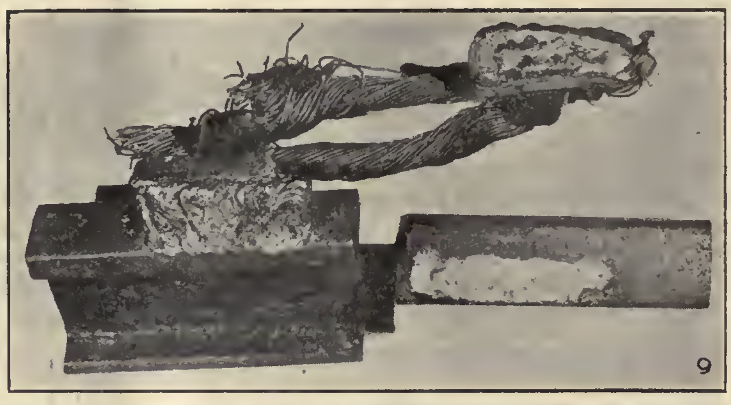
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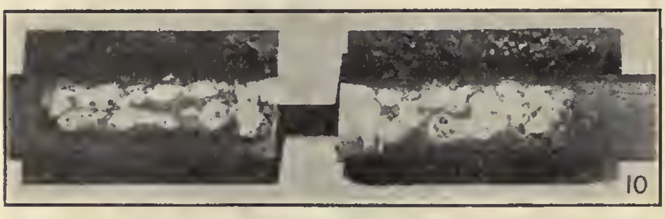
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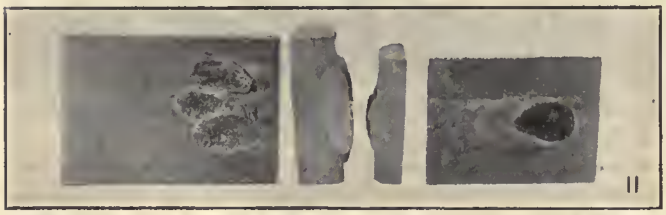
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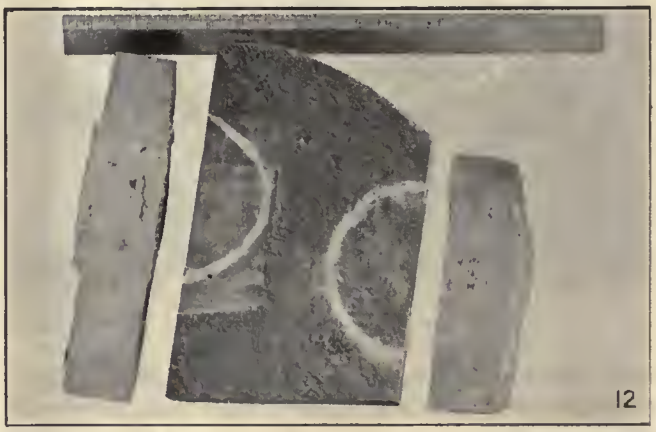
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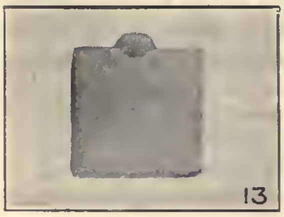
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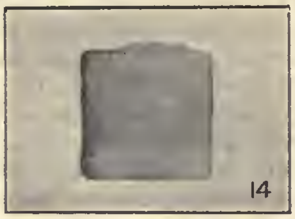
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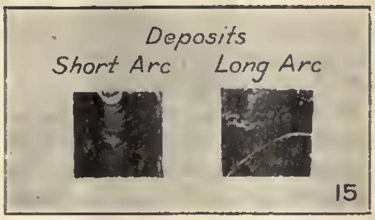

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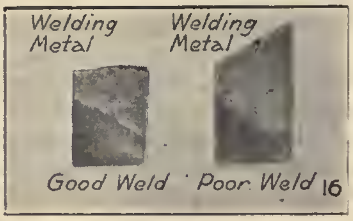

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Fig. 2—Method of welding gear cases used by Sydney, Australia, electric railways.

Fig. 3—Bottom welding on a steel transformer tank, where arc welding surpasses gas welding.

Fig. 4—Welding finishing nails head-on to car sizing for attaching felt lining.

Fig. 5—Manner of reclaiming worn coupler head by arc welding.

Fig. 6—Section through built-up armature shaft, showing blowholes and change in crystalline structure.

Fig. 7—Two views of car wheel on which the flange has been built in thirds by welding.

Fig. 8—Cutting cast iron (left) and steel plate (right) by means of the electric arc, using the graphite electrode process.

Fig. 9—Arc welded bond tested for strength. Right-hand terminal indicates thorough weld resulting from weld made with rail positive and electrode negative.

Fig. 10—Appearance of rail surface from which arc-welded bond has been sheared. Weld was made with rail negative and electrode positive.

Fig. 11—The depth of crater and the overlap of deposited metal form an index of the depth of penetration of the weld.

Fig. 12—Two welds on cast steel; left-hand weld was made with metallic electrode, whereas right-hand weld was made with graphite electrode process.

Fig. 13—Polished and etched section through metal deposited by using a short arc.

Fig. 14—Polished and etched section through metal deposited by using a long arc.

Fig. 15—Surface appearance of welds made with short arc (left) and with long arc (right).

Fig. 16—Section through two welds, showing effect of current value. Too low current was used in right-hand piece.

metal, which is practically pure iron in cast form, contains a certain amount of blowholes. Furthermore, the heat of the arc and of the deposited metal has raised the temperature of the shaft metal adjacent thereto to a sufficiently high value so that when it is cooled rapidly the crystalline structure is changed. This metal is chilled rapidly both by heat which is conducted into the central portion of the steel shafting, which is at a relative low temperature, and by radiation through the deposited metal to the air. The result is a chilled section of steel shafting which is relatively brittle. A subsequent heat treatment will bring back all of the shaft material to its original crystalline structure, but no amount of heat treatment will change the characteristics of the deposited metal by any very appreciable degree, due to the fact that it is cast material and contains practically no carbon.

TAPERED FITS ARE BUILT UP ECONOMICALLY

For these reasons we do not ordinarily recommend building up of heat-treated steel shafting at points where severe strains take place. There are cases, however, where this is entirely permissible; for example, in building up the tapered fit for a gear pinion or the threaded end of a shaft for re-turning to accommodate a nut for securing the pinion. We have also used this process for extending some shafts used on cranes in our own shops with very good results. However, there are cases where the severe vibration and alternating stresses set up in the shaft will make it absolutely inadvisable to apply the welding process.

Fig. 7 illustrates a built-up flange and bore of a car wheel. Approximately one-third of the flange was left in its original state, another third at the right was welded and then turned down, after which the left-hand third was built up and left as finished from the welding operation. The reverse side of this same wheel is also shown in Fig. 7. By the discoloration seen in the lower right hand one-third portion of the wheel it is obvious that the heat of the welding arc and the deposited metal have changed the structure of the wheel materials. The use of this practice is therefore of very questionable value, especially where high speed service is encountered. For city service, however, I believe this practice would prove satisfactory and if properly handled would be often found more enomical than the use of a new wheel or turning the wheels down to reestablish the proper contour.

The welding of small cast-iron sections presents special problems. The deposited metal is soft, as is also the cast iron, but the metal at the zone of union between the cast iron and the deposit, representing a skin of approximately 1/32 to 1/16 in. in thickness, will be very hard. This is because the pure iron deposited by the metallic electrode absorbs some of the free carbon, known as graphitic carbon, from the cast iron and is chilled due to the heat flow into the cast iron and also radiation to the air. This therefore forms a shell of high carbon cast steel which is very hard and can only be eliminated by either preheating the cast iron before the welding work is done or else annealing the casting after the welding is finished. Where the material can be finished by grinding it is unnecesary to get rid of the hard zone. But if machine work must be done in the region of the zone of fusion it is necessary to have this hard shell eliminated.

The electric arc can be used effectively for cutting purposes. Fig. 8 shows two samples of cutting by the graphite electrode process. The sample at the left is a piece of cast iron 1½ in. thick, which was cut for a length of approximately 10 in. in three minutes, using a current of 400 amp. This is at the rate of 16½ ft. per hour. The sample at the right is a piece of steel plate 1 in. thick which was cut using a 400 amp current, the length of the cut being approximately 13 in. It was made in three minutes, or at the rate of 21½ ft. per hour.

Fig. 9 shows a test sample of electrically welded rail bond, the weld having been made with the bond connected as the negative electrode and the rail as positive. The sections of rails which were available were not sufficiently large to permit welding the bond in its proper position on the side of the head, and therefore it was welded on the face of the head. This bond was tested for strength in an Olsen testing machine by gripping the two pieces of rail in the jaws of the machine. The test results are as follows:

One of the twin cables pulled out of each terminal at 1,350 lb. The left-hand copper terminal was then given a shearing stress by compressing it, the compressing pressure being 11,200 lb., when it commenced to shear from the deposited metal. The deposited material of the right-hand terminal was sheared from the rail by a pressure of 34,000 lb. By observing the light portion shown on the head of the rail it is evident that a very good job of welding was secured, giving a very thorough fusion.

Fig. 10 shows the results obtained using the welding polarity obtained by making the rail negative and the electrode positive, as in ordinary service where welding current is obtained from the overhead trolley wire working through a resistance to the electrode. These samples were also pulled in the Olsen machine and given a shearing test with the following results:

The cables pulled out of the terminals at 5,520 lb. The weld metal sheared from the left-hand rail section at a pressure of 29,580 lb., and from the right-hand rail section at 17,400 lb. The "spotty" appearance of the weld surface from which the bond has been sheared indicates that the fusion of the metals was not complete. This appearance in Fig. 10 is compared with that in Fig. 9.

HOW TO INSPECT A WELD

Fig. 11 shows the results obtained when making a deposit upon a strip of steel plate by using a 3/16-in. diameter electrode and a current of 350 amp. This also shows how the depth of the penetration of the deposited metal, indicated by the section of the two center pieces, can be judged from the depth of the crater appearing both in the right-hand piece and at the three places on the left-hand piece. By observing these characteristics, together with the overlap of the deposited metal at its edges, the operator can very readily judge the satisfactoriness of the deposit relative to a weld of desirable strength.

Fig. 12 illustrates polished and etched sections through welds made in a steel casting, that at the left having been made using a 3/8-in. diameter metallic electrode and 400 amp., whereas the right-hand weld was made using the graphite electrode process. The same metallic electrode material was used as filler metal and the same current in both cases. When using large metallic electrodes or the graphite electrode process the operator is very likely to have a considerable amount of slag inclusion, as indicated by the sections. Therefore we do not ordinarily recommend these processes except where the speed of doing the work is of more importance than strength of the weld. In the case of the left-hand metallic electrode weld the metal was deposited at the rate of approximately 3⅓ lb. per hour, whereas in the right-hand weld made by the graphite electrode process the metal was deposited at the rate of approximately 3.43 lb. per hour. The size of the parts can be judged from the rule, which is shown immediately above the pieces.

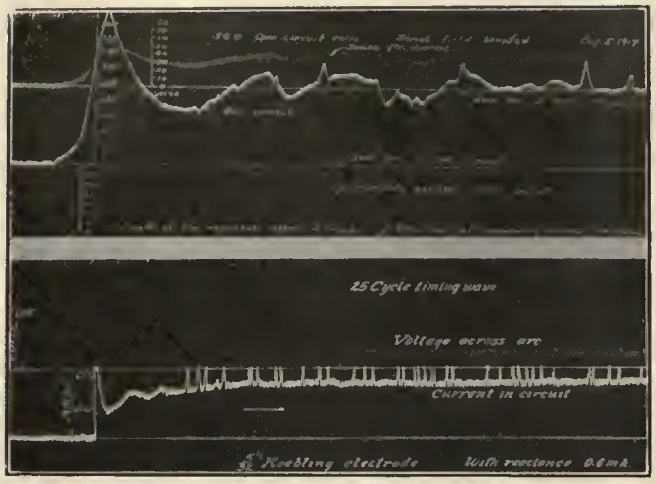


FIG. 17—GRAPHS COMPARING RESULTS WITH AND WITHOUT REACTOR. AT TOP, NO REACTOR IN CIRCUIT AT BOTTOM, REACTOR USED

For test purposes a 14-lb. deposit approximately 4 in. wide, 2 in. thick and 12 in. long made on a piece of ⅜-in. steel by using $\frac{5}{32}$-in. diameter electrode and 160 amp. of current was made. This was ground, polished and etched and it could then be seen that very little slag or oxide inclusions were present. Therefore where a weld of maximum strength is desired we usually recommend the use of smaller size electrodes, namely, $\frac{5}{32}$ to $\frac{3}{16}$ in. in diameter maximum, and a current of from 160 amp. for the smaller to 225 amp. for the larger electrode.

Test samples in the shape of a small shaft with a threaded head at each end were then turned up from the metal in the 14-lb. deposit. The tests on these pieces of solid deposited metal showed the following characteristics:

Ultimate tensile strength, 58,225 lb. for one piece and 56,075 lb. for another, the yield point being 35,875 lb.; elastic limit 29,000 lb., per cent elongation in 2 in., 16 for one and 18 for the other; per cent reduction of area, 23.4 for one and 27.8 for the other.

LENGTH OF ARC AND PROPER CURRENT VALUE

Fig. 13 shows a polished and etched section through a deposit made with ⅛ in., 22-volt arc on a piece of 1-in. x 1-in. steel. The depth of penetration of the deposited metal and the concentration of this material are evident. Fig. 14 shows a similarly prepared section through a deposit made with a long arc. In the case of the long arc the air drafts which are always present cause the arc to play about over the surface of the work, scattering the metal around and causing a great deal of porosity. It will be observed in Fig. 14 that the deposited metal has not penetrated into the steel piece to any extent and that it is scattered over a considerable area. Fig. 15 shows the plan view of these same two pieces, showing the metal deposited by the short arc at the left to be very smooth and relatively free from porosity and oxidation, whereas the metal deposited by the long arc at the right is very porous, poor material and is scattered over a considerable area.

Fig. 16 illustrates the importance of using a sufficiently high current to obtain good fusion between the deposited metal and the part being welded. The sample at the right was made with too low a current value, so that the deposited metal pulled away from the surface very readily, as indicated at the top edge. The left-hand sample was made with a sufficiently high current. When tested it broke through the center of the weld, where it would be expected to break, owing to the fact that the entire section was machined down to a uniform thickness. The deposited metal is cast material and hence would break before the parts welded, which were mild rolled steel.

The use of a reactor or inductance coil in each metallic electrode circuit is recommended. The advantages of the reactor are that it makes it easier for the operator to strike his arc and also gives the arc additional stability. This is of especial value if the steel upon which the operator must do his welding work contains foreign matter, such as grease, absorbed gas, rust or other foreign substances, which under the heat of the arc will form gas, tending to blowholes in the molten metal. The electromagnetic energy stored in this reactor gives the arc additional stability. When the operator strikes his arc the reactor keeps the current from building up to such a high value as to cause the electrode to stick or freeze to the work.

In Fig. 17 is shown in curve form the result of using a reactor. The upper curve was taken with a welding circuit having no reactor connected therein. Below is illustrated the effect of the reactance in the same welding circuit, without changing any other conditions except connecting in the reactor in series with the welding resistance.

Moving Platforms for Crosstown Lines

Consulting Engineers Outline a Solution of the Crosstown Traffic Problem by Using Moving Platforms Propelled by the Electric Carrier System—Details of the Proposed Platforms Are Given

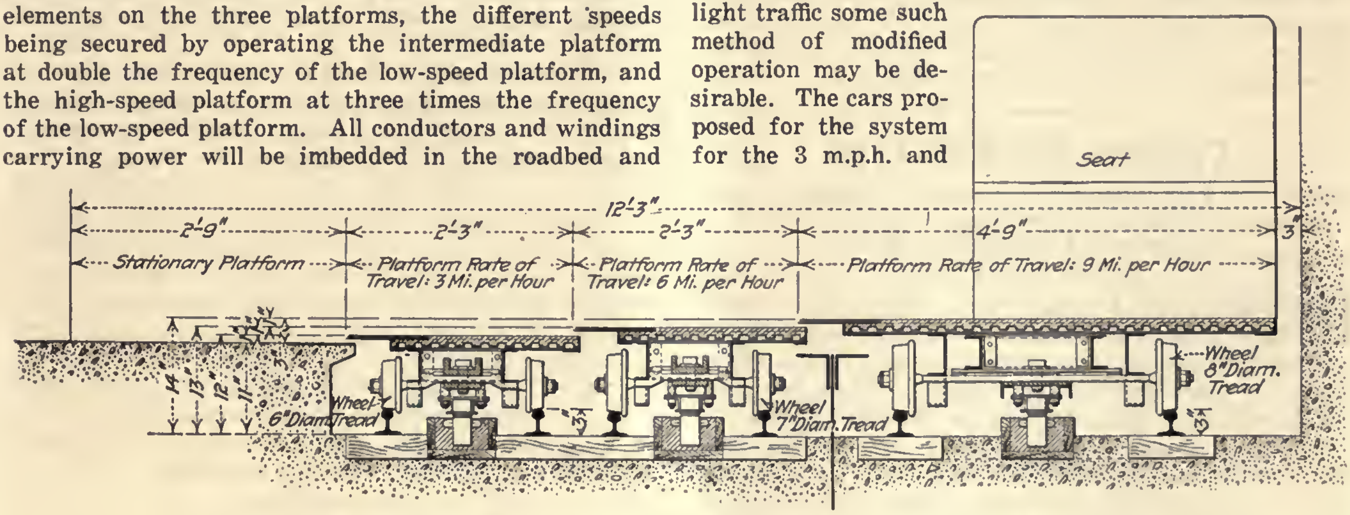
AT THE meeting on Nov. 17 of the New York section of the American Society of Civil Engineers L. B. Stillwell of the firm of Stillwell & Putnam, consulting engineers, presented a paper briefly describing a moving platform to handle crosstown traffic on Fourteenth, Forty-second and Fifty-seventh streets. Since the publication of the abstract of this paper in the ELECTRIC RAILWAY JOURNAL of Nov. 27, 1920, on page 1102, more detailed information has become available about the design and the means of propulsion of the moving platform.

As early as May 15, 1902, moving platforms were proposed to the former Rapid Transit Commission by the then Commissioner of Bridges, Gustav Lindenthal, who wished to install such equipment on the Brooklyn Bridge. The Public Service Commission, however, having succeeded the Rapid Transit Commission, declined to approve Gustav Lindenthal's plan. Several times since propositions to install moving platform subways on the more important crosstown routes have been laid before the traction companies and the Public Service Commission, only to meet with an unyielding opposition. Now further public efforts have been induced by the inadequacy of the shuttle train service in the Forty-second

Street subway, and certain legislative changes in the Public Service Commission afford an opportunity which will permit serious consideration of a method offering a solution for the relief of congested crosstown traffic.

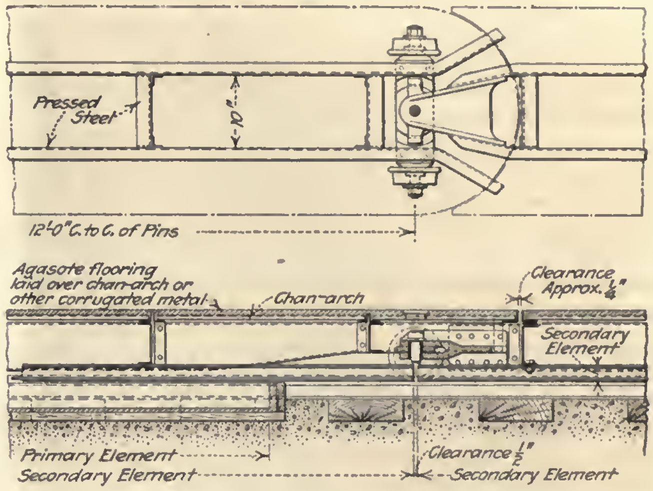
In the report on this subject by the engineers recommending the new plan the success of previously proposed methods where the platform is carried on rollers, mounted on shafts which are driven by stationary motors, is doubted because of inherent mechanical difficulties. The electric carrier system of propulsion will permit the use of platforms mounted on car trucks, which will effect a material reduction in the cost of construction, operation and maintenance, and also of the space required. The distinguishing characteristic of this system is the method of propulsion. Instead of a complete motor being mounted upon the car and transmitting mechanical power therefrom through gears to the wheel, or driving carrier wheels on which the platform moves, the three-phase induction motor of the squirrel-cage type is used. These parts are separated, that corresponding to the stationary or primary element of the motor being straightened out into sections about 5 ft. long and placed midway between the rails in the roadbed, while that corresponding to the revolving element, also straightened out, forms a continuous short-circuited secondary mounted on the bottom of the car. The primary elements, when energized with three-phase current by induction, magnetize the short-circuited secondary which extends continuously along the bottom of the car. The result is that the force created between the induced secondary current and the shifting field of the primary propels the car.

The scheme proposed is to use three platforms of 27 in., 27 in. and 57 in. width, respectively, moving at 3, 6 and 9 m.p.h. The high-speed platform carries seats for two persons spaced at 3-ft. intervals. It is proposed to use identical construction for the electrical elements on the three platforms, the different speeds being secured by operating the intermediate platform at double the frequency of the low-speed platform, and the high-speed platform at three times the frequency of the low-speed platform. All conductors and windings carrying power will be imbedded in the roadbed and thoroughly protected and insulated against damage by water in a manner to make accidental contact and danger very remote. The current will be carried at relatively high potential to transformers located at points along the system and thence by cables in ducts to the primary element between the rails. The primary element, as explained, is not continuous, but will be installed at intervals in sections about 5 ft. long. In the case of the 3 m.p.h. platform the primaries will be approximately 400 ft. apart, in the case of 6 m.p.h. platforms 200 ft. and in the case of the 9 m.p.h. platform 60 ft. apart. Each primary element will produce a pull equivalent to a 1½ to 2-hp. motor. The secondary, consisting of copper punchings imbedded in the lamination, is continuous except for a ½ in. break between cars.



CROSS SECTION OF SUBWAY SHOWING ASSEMBLY OF PLATFORMS

The power supply will be produced by a motor generator set, in which a single motor will drive three generators mounted on a single shaft. The generators will produce three-phase alternating current at 10, 20 and 30 cycles respectively or some multiple of these frequencies. As the speed of the different platforms depends on the frequency of the three-phase current applied to the primary, it is clear that any platform may be operated at a lower speed by changing the frequency supplied to it, in case it should be desired to shut down one platform and operate the other two, or in case one platform only is to be operated. During periods of light traffic some such method of modified operation may be desirable. The cars proposed for the system for the 3 m.p.h. and 6 m.p.h. elements will be about 12 ft. long and 28 in. wide, constructed from channels which support a pressed-steel platform covered with 1½-in. agasote, giving a light and non-slippery surface. Each car is supported by a pair of wheels and coupled at the rear by a kingpin to a similar pair of wheels on the car immediately following. The two slower-speed elements run on a track of 18-in. gage, while the gage of the track for its 9 m.p.h. platform is 32 in. Axle friction on curves will be minimized by the use of roller bearings for the wheels. Friction and wear can still further



PLAN AND LONGITUDINAL SECTION SHOWING MOVING PLATFORM DESIGN be reduced by keeping the track well greased on curves and on tangents, since magnetic pull and not the adhesion of the wheels to the track is used for propulsion. The resulting low rail and wheel wear will reduce the extent of the adjustments required to maintain the standard air gap, but such adjustments can easily be made when necessary.

The high-speed platform overlaps the medium-speed platform, which, in turn, overlaps the low-speed platform. This difference in elevation is secured by the use of 8-in., 7-in. and 6-in. wheels on the high, medium and low-speed platforms respectively. The overhanging edge of each platform is covered with a non-slip tread to prevent accidents to passengers while passing from one platform to another. Posts on the low-speed and intermediate platforms are provided as supports to assist the less alert passengers in progressing from one platform to another. The third platform has a passageway 21 in. wide besides the seats, which occupy 36 in. of the width.

The application of the electric carrier system to the Forty-second Street loop would require three platforms, each approximately 10,100 ft. long. The seating capacity of the 9-mile platform would be 31,680 passengers per hour in each direction. The weight per seat for all three elements would be roughly 375 lb., while that of a loaded subway train is approximately 1,800 lb. per passenger. About 350 kw. would be necessary for its operation and about 3,000,000 kw-hr. per year. Although, electrically, the air gap of $\frac{3}{16}$ in. used is far from ideal, the increased losses due to a low power factor are inconsiderable compared with the small amount of power required for its operation. The estimated initial cost of this project for equipment and its installation, exclusive of excavation, is about $750,000.

An electric carrier system installed as a demonstration plant near Paterson was in successful operation for several years and its use is now being contemplated for postal service in several large cities.

Preserve the Pole Line

Analysis of Pole Preservative Methods in Indiana Shows Ample Justification for Their Use—Data Upon Which This Analysis Is Based Were Secured from 100 Utilities

PRESERVATIVES for wooden poles, preservative treatments and all that pertains thereto are subjects of prime importance to electric railway distribution engineers and administrative officials. While very few pole lines constructed of treated poles have reached the replacement stage, any information that sheds light upon the subject is worth investigating. In a recent publication of the Engineering Experiment Station of Purdue University Prof. R. V. Achatz has set forth the results of a study which he made with particular reference to the needs of executives responsible for the construction policies of public utilities. Data for this study were obtained from about 100 electric railway, steam railroad, telephone, telegraph and electric power companies operating in the State of Indiana. The estimated annual requirements of these companies are about 40,000 poles. From 60 to 70 per cent of those now being set are given some kind of preservative treatment. Practically all of the well-known forms of pole treatment are being used.

Some timbers decay rapidly when exposed to the weather, while others are affected to an almost negligible extent. Most pole decay occurs at the ground line and the rapidity with which decay progresses depends greatly on the character of the soil and the climate. It is obvious, therefore, that no one preservative or method of treatment is best for all purposes. The choice of preservative should depend upon the conditions of service, as well as upon the method of application and the price.

To provide effective protection from decay the wood preservative must have strong germicidal properties; it must have penetrative ability; it must not evaporate, and it must not be soluble in water. Preservatives obtained by the distillation of coal tar possess these qualities and have come into wide use. Dead oil of coal tar or creosote oil and the higher boiling oils, known as carbolineums, are the most satisfactory preservatives. Coal tar itself should not be used, as it has little value as a preservative, and "mixed creosote oils"—that is, those preservatives containing undistilled products—are not recommended.

In Indiana the commonly used treatments are the brush and the open-tank. Poles of less durable woods treated by the pressure tank process are as yet expensive for this reason and have not come up to the present time into general use.

An analysis of the economic side of pole preservation shows that under average conditions an increase of life of about two years will justify brush treatment, three and one-half years open-tank dipping treatment in hot creosote, and seven and one-half years hot and cold-bath open-tank treatment. The results of the inspections made in various parts of Indiana indicate that an increase in life greater than that necessary to justify treatment will be secured if the treatment be properly given. In most cases where treatment has failed to protect the poles from decay the failure can be traced to improper treatment or to causes which the treatment itself could not control.

By far the greater number of poles in service at the present time have been set without preservative treatment. As the poles on the older lines are now nearing the end of their life much interest has arisen in the problem of deferring replacement. It is possible to do this to a certain extent by reinforcement and by treatment in place. The most common form of reinforcement is that of setting a creosoted stub alongside the weakened pole and binding the two together by wire. Another method used where decay has not progressed too far is to excavate the earth from around the pole, clear away the diseased wood and apply a brush treatment. Concrete reinforcement has been applied to some extent, but on account of cost can be recommended only where the cost of replacement is very large.

Report on Lubricants

A REPORT of the inquiry committee on lubricants and lubrication, made under the direction of the Department of Scientific and Industrial Reasearch in England, has just been published. This report contains the results of a research made to determine the relation between viscosity of lubricants and the load on a bearing and the action of lubricants at high temperatures as applied to commercial methods of oil testing. Copies of this report may be obtained directly by addressing H. M. Stationery Office at Imperial House, Kingsway, London.

Trend of Safety Car Construction

A Review of Some of the More Recent Changes in Safety Car Design Points Toward the Development of a Type with Increased Capacity, Greater Comfort and Convenience and Additional Safety —Changes During the Past Year Have Been Directed Principally Toward Increasing the Strength of Various Structural Parts

SAFETY CARS ARE A FAMILIAR SIGHT IN NEW HAVEN

ONE-MAN car operation has proved both satisfactory and economical for light and average service requirements. For lines where traffic is very dense a larger unit is needed. There is still a very commendable desire on the part of both operators and manufacturers to improve safety car construction and to enlarge the field of its usefulness. In the report of the committee on safety car operation, presented to the American Electric Railway Transportation & Traffic Association at its convention held in Atlantic City last October, conclusions were given as to the limitations of the safety car based on answers from member companies received to a questionnaire. This report states that half the companies that sent in information and are operating safety cars report changes and departures from specifications of the standard Birney safety car. The principal changes consist of:

1. Use of heavier and better riding trucks.
2. 24-in. cast steel wheels replaced by 26-in. steel wheels.
3. Specially designed rubber cushions installed in the truck suspension bolts to reduce noise.
4. Larger motors used for propelling the car.
5. Larger compressors used.
6. Air piping located inside of car to prevent freezing.
7. Brake levers and chains provided with safety jaws.
8. Additional heaters installed in place of the eight used as standard, one of these being a cab heater.
9. Seating arrangement changed.
10. Wider seats and wider aisle used.
11. Wooden-slat seats replaced by full rattan covered or upholstered seats.
12. Fenders used in place of life guards.
13. Voltage push buttons without exposed metal parts used instead of buttons with exposed parts.
14. Platform arrangement revised to facilitate loading and passenger movement.
15. Maximum step height reduced by using ramp platform.
16. Double floor used.
17. Structural strength of underframe increased.
18. Platform strengthened.
19. Heavier bumpers and stronger dash used.
20. Heavier materials used for roof and sides.
21. Headlining added for interior ceiling to improve appearance and add warmth in winter.
22. Lining added between the floor and window sill along sides and dash.
23. Storm sashes added.

It will be noted from this list of changes that the more important ones have to do with increasing the strength of various structural parts, increasing the facility for boarding and alighting passengers, providing a seating arrangement to meet local conditions and providing more heating capacity and a more heat-resisting body construction in places where severe winter weather is encountered, the standard safety car having been developed for climatic conditions prevailing in the south. The changes have increased the weight of the car somewhat, but have undoubtedly resulted in a stronger construction and one which will withstand severe operating conditions more satisfactorily.

CHANGES IN CAR CONSTRUCTION

The present trend of safety car design can best be studied by considering some of the changes from the standard type of construction that have been made by various railways in an endeavor to meet operating conditions as they exist on their individual properties. In this analysis the changes which have been made and those which are being advocated by railway engineers as desirable can be grouped under five headings: (1) Changes necessary for strengthening construction; (2) changes for providing greater comfort and convenience to passengers as the use of wider and more comfortable seats, easier riding trucks and the reduction of step height; (3) changes found desirable for winter operation in cold climates, such as the use of lining, double floors, storm sash, an increased number of heaters and larger diameter steel wheels; (4) changes to provide greater safety to passengers, such as rearrangement of platform lights to illuminate steps, use of safety panels for switches and fuses, improvements in brake rigging, removal of circuit breakers from car vestibule, removal of foot valve from motorman's control; (5) changes which appear desirable in order to provide increased capacity and facilities for handling crowds on heavy traffic routes, such as the use of larger cars with longer platforms, double doors, platform railing, longitudinal seats at ends and a wider aisle.

From the standpoint of construction there appears to be rather a general feeling among the officials of railway operating companies that the first safety cars were built of too light construction, that to date the idea of maintaining the standard type of construction first advanced has received too great consideration by the builders and that there are essential a number of changes and refinements. The use of a stronger construction which seems advisable may necessitate the addition of slightly more weight, but perhaps the additional strength can be obtained through the use of better materials.

INCREASED SAFETY IS PROVIDED BY INSTALLING ALL SWITCHES AND FUSES IN A SAFETY PANEL

In this connection the remarks made by P. J. Kealy at the meeting of the Transportation & Traffic Association in Atlantic City Oct. 7, 1919, are of interest. In speaking of the changes made in the Kansas City safety cars, he said that he considered that the radical innovation with respect to the reduction of weight in safety car construction as carried out had produced a rather flimsy type of construction for severe operating conditions. As a result of this feeling many of the cars furnished during the past two years have had substantial changes made in the type of construction. This is probably best evidenced by the increase in weight of cars now being furnished, which is in the neighborhood of 16,000 lb., while the first safety cars weighed but 12,000 lb. In Kansas City the last order for safety cars required the strengthening of some of the structural members by the use of buffet plates and additional cross bracings. In the 200 cars furnished for the Brooklyn Rapid Transit Company a new type of truck of stronger construction with friction bearings was furnished. The vestibule construction was stiffened and a heavier bumper construction used. Other roads have required similar changes from the first type of standard construction.

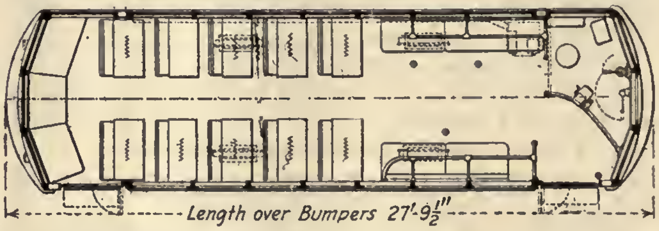
PROVIDING GREATER COMFORT AND CONVENIENCE FOR PASSENGERS

The merchandising consideration of providing greater comfort and convenience for passengers is one which apparently warrants a deviation from standard construction. Changes which have been made and others which are advocated consist in the use of wider seats and a change from the standard wooden-slat-seat construction to a cushioned type; the use of easier riding trucks, and a reduction of step height to encourage more riding and to prove an added attraction apparently equal to that of frequent and fast service. In the Kansas City cars the distance of the first step above the rail is reduced from 16 in. to 14 in. by placing the wheel housings under the seats and by using a very slight ramp in the floor of the front platform. The inside seating arrangement was altered by the use of longitudinal seats at the entrance in an endeavor to help eliminate congestion, and stanchions for the use of standing passengers were placed in front of the longitudinal seats. Cushioned seats were also used, as Kansas City officials felt that the traveling public in that city had been educated to the use of this type of seat and it was easier to fit the car to the public than to expect the public to accommodate itself to certain changes in car design. Their experience was that the public would not walk back through a long narrow aisle and they considered the idea of the original seating arrangement of the safety car as directly counter to the latest development in seating design of the last ten years, which provided a loading well.

CHANGES FOUND NECESSARY TO MEET SEVERE WINTER CONDITIONS

The standard safety car as originally designed was for service on the Stone & Webster lines in Texas and other Southern railway properties. For service in cold climates and locations subject to severe winter conditions experience has already demonstrated the necessity of equipping certain cars with both side and head lining. The use of storm sash and double floors also has appeared essential, as well as an increase in the number of heaters, and perhaps the employment of cross-seat heaters to give a better distribution of heat, as was first used in Brooklyn for these cars. On this latter road ten cross-seat heaters and two truss-plank heaters were used per car. The truss-plank heaters were installed under the motorman's seat to act as cab heaters for the operator. There is no doubt that the cross-seat type of heater is the most popular with the traveling public and Brooklyn officials felt that by specifying this type for their cars they would help to make safety cars more popular with passengers.

Some of the changes found necessary in the safety cars used at Levis, Que., in order to provide for severe winter conditions as they exist there, are of interest as indicating what may be necessary in cars operating in northern climates. The principal differences from the usual standard features of car construction are: (1) Double lining throughout; (2) double floor; (3) storm windows or sashes on all windows; (4) ventilators capable of being closed as required; (5) all vestibule windows permanently fixed except center



SEATING ARRANGEMENT FOR SINGLE-END SAFETY CAR AS USED IN KANSAS CITY window, being drop sash; (6) air equipment especially installed with proper amount of radiating pipe to prevent freezing of air and moisture accumulation from the cold; (7) operating motors with covers for closing up of the ventilating ducts in winter to prevent snow accumulation; (8) the use of 26-in. wheels to give a maximum clearance on account of high centers caused by snow and ice, and (9) the use of twelve heaters per car instead of the standard number. An article describing these cars published in the April 3, 1920, issue of the ELECTRIC RAILWAY JOURNAL, page 699, gives other interesting information regarding changes which were incorporated in these cars and results from their operation during the severe winter of 1919-20.

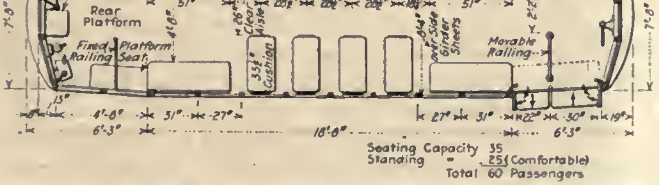
PROVIDING GREATER SAFETY FOR THE TRAVELING PUBLIC

The name "safety car" is now generally accepted as designating this type of one-man car and a determined effort should be made to increase its safety features wherever possible in order that the traveling public may be more thoroughly convinced that this type of car is in reality safer than the ordinary two-man car.

In reviewing the answers to the questionnaire sent out by the committee on safety car operation of the American Electric Railway Association it appears that the majority of accidents which have happened are due to the operator devoting his attention to passengers while making change or issuing transfers while the car is in motion. The use of the foot valve in connection with the car operating equipment, while a great convenience to the operator, is looked upon with suspicion by some managements as encouraging the operator toward other duties which detract from the proper operation of his equipment.

With the present standard location of equipment, the circuit breaker is located inside the front vestibule. Whenever overload conditions occur the blowing of this circuit breaker alarms the passengers, and in cases of crowded conditions injury is liable to result. On other types of equipment it has long been considered essential to place all circuit breaking mechanism underneath the car and remove all danger from serious results of this character to a location remote from passengers. The changing of the present location of the circuit breaker has been considered in several instances as offering a field for improvement.

To prevent the lights in the body of the car from interfering with the view of the motorman during hours of darkness a curtain is provided which is drawn around the back and right side of him. The lights to the right of the operator are also equipped with shades for this purpose. It has been suggested that a better arrangement of lights could be provided, so as to provide not only for less interference with the view of the motorman but also to provide illumination of the step when the door is opened.



A PROPOSED SEATING ARRANGEMENT FOR DOUBLE-END SAFETY CAR WITH DOUBLE DOORS

The use of a safety panel for all switches and fuses in the light, buzzer, compressor, register and heater circuits as first used on the cars of the Brooklyn Rapid Transit Company is also an additional feature of safety worthy of consideration, as is also the use of push buttons without exposed metal parts, as was suggested in the first part of this article.

Improvements in brake rigging connections by the use of box-type jaws have been furnished for cars of operating companies controlled by the Second District Public Service Commission of the State of New York. In his report to the commission regarding this feature, Charles R. Barnes, then chief of the division of electric railways for the commission, reported that there were at least thirteen points in the braking system where if a bolt broke or became loose and dropped out it would disable the entire braking system for both air and hand operation. His recommendation was that the braking system should be improved by the use of box-type jaws at all points where members were connected with clevis and bolts, and this, it is understood, is being required by all cars controlled by the Second District Public Service Commission.

FREQUENT SERVICE WITH SAFETY CARS HAS INCREASED TRAVEL AND MADE THEM A SUCCESS

A LARGER CAR IS BEING ADVOCATED FOR SOME LOCALITIES

Where safety cars have been used in large cities, such as Brooklyn, Philadelphia, Baltimore, Boston, etc., their use has been confined in most instances to routes having light traffic characteristics. Where existing headways are three minutes or less and where traffic is so heavy at times even during off-peak periods that car-carrying capacity is a controlling factor, the usefulness of the standard safety car is restricted, because of its smaller carrying capacity and the fact that no improvement in earnings may be expected from improved headway. The use of the safety car has produced such marked economies in communities with less severe service characteristics that these economies have led to a desire to try to adapt the safety car if possible to crowded conditions. This has already led in a small way to the tentative use of larger double-track cars with one-man safety features.

There is without doubt a growing tendency toward increasing the capacity and facilities for handling crowds and heavier traffic with one-man operated cars. The question as to whether one man can satisfactorily handle this increased traffic is still debatable and there is strong opposition from certain quarters regarding its feasibility. This problem of whether such a car can be handled satisfactorily by one man will have to be worked out by actual trials in service. In addition to providing a car with increased seating capacity, designs for such a car will include longer platforms, the use of double doors for entrance and exit of passengers, the employment of platform railings to separate incoming from outgoing passengers, the use of longitudinal seats at the ends of the car body to provide ample space for passenger movement and for standing passengers and the use of a wider aisle so that passengers can move in and out of their seats with greater freedom. Double doors for cars with provisions for separating incoming and outgoing passengers have been built and are in operation in several cities in this country. The desirability of using double doors has come largely from the endeavor to make the safety car serve for rush hour conditions and lines with heavy traffic characteristics.

Where large groups of people board and alight at one point there is undoubtedly an annoyance to the passengers boarding in their having to wait until the leaving passengers are all discharged before they can get on. Some of the principal arguments used against the adoption of double doors for a one-man operated car are that one man cannot satisfactorily handle the two streams of traffic and that as soon as passengers cease getting off those waiting to board will use the exit door in order to gain access. With the two openings, there is also danger that passengers may slip in without paying their fare. Such radical changes in design as this are also considered as a setback to the standardization. The cost of such a car would be increased and its weight per passenger seated would unquestionably be more.

As an example of a one-man car of somewhat greater proportions and seating capacity than that of the standard Birney car, the Three Rivers Traction Company of Three Rivers, Que., has recently added four cars to its equipment with general dimensions as follows:

Length of body	21 ft.
Length of front vestibule	6 ft. 2 in.
Length of rear vestibule	4 ft.
Length over bumpers	32 ft. 2 in.
Width of car bumper	8 ft. 6 in.
Seating capacity	36 persons

The front vestibule of this car is made extra long and the step opening is extra wide to facilitate entrance and exit. Separate openings are also provided for entrance and exit and each opening has an individual folding door and step operated by a National Pneumatic Company door-engine. These are so arranged that the motorman can operate them singly if desired.

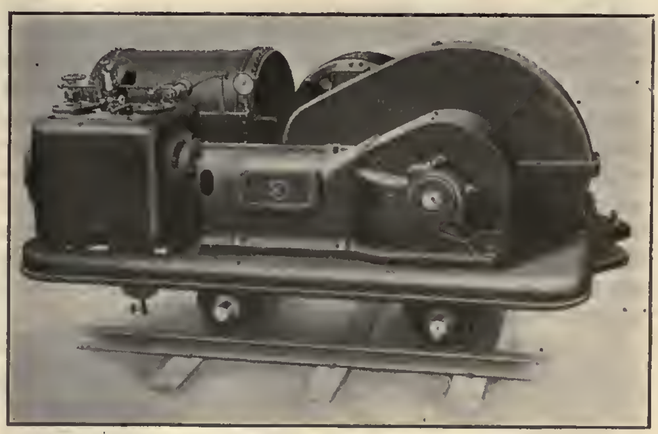
A proposed type of car having these characteristics was described in the ELECTRIC RAILWAY JOURNAL for Sept. 18, 1920, page 549. The principal idea of this design was to make available the great economic advantages of the safety car to properties operating in large cities and having extremely heavy traffic conditions. Other operating engineers are also making studies for a type of car built along these general lines.

The desirability of a separate entrance and exit is not confined to the idea of developing a larger car for congested traffic conditions as is evidenced by their use at the present time in small-sized cities. In Mason City, Iowa, and Madison, Wis., the introduction of the double door came about through a desire to reduce length of stops and to avoid annoyance to boarding passengers by compelling them to wait until all have alighted. Nevertheless, it is noteworthy that safety car operators in much larger cities have expressed themselves as content with the standard platform and doorway arrangements.

The safety car, embodying as it does the most decided step ever taken toward standardization, has caused some rather sharp conflicts between the users and manufacturers. The advantages of standardization cannot be doubted. However, in insisting on rigid adherence to standards, there should be no stifling of sound development in the improvement of the safety car or any of its equipment. Many worthy changes have already been introduced since this type of car was brought out, and it would be unreasonable to expect that other still important changes should not be incorporated. The most general feeling in regard to standardization on this particular car seems to be that the present general dimensions of length, width, height and general capacity are satisfactory. With the improvement in strengthening construction that is advocated the standardization of the body construction would be pretty generally adopted for local service. The finishings and the car-seating arrangement, etc., should be left to individual operating companies.

Portable Air Compressor

A FLEXIBLE and economical compressor outfit which can be moved to the point of distribution has recently been placed on the market by the Chicago Pneumatic Tool Company. The feature of portability results in the elimination of line losses and expensive piping systems. Where air is used at a great distance from the compressor and where temporary piping is laid which is subject to much abuse, the line losses are very high. The economy effected by the elimination of these losses far more than offsets the difference in efficiency between one large unit and several smaller ones, not to mention the saving in time, trouble and expense of laying pipe lines.

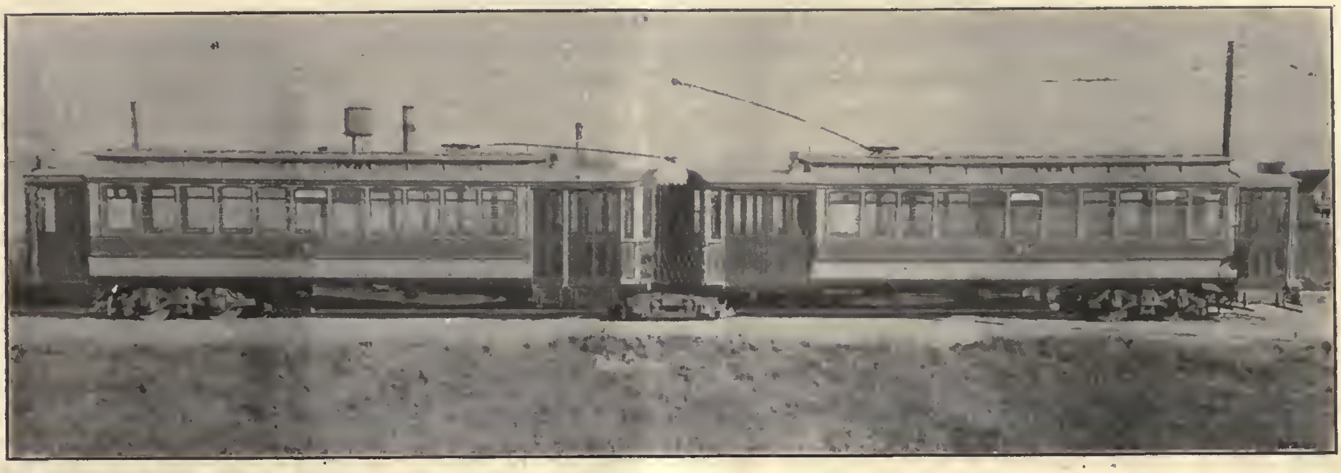

PORTABLE ELECTRIC-DRIVEN AIR-COMPRESSOR UNIT

This rugged and simple compressor of the horizontal single-stage type is totally inclosed. It is hopper water-cooled and driven by an electric motor through herringbone gears. The complete outfit, consisting of compressor, air reservoir, motor and starter, is mounted on a substantial car readily adjustable to suit any track gage commonly found. Although this outfit is primarily designed for the mining industry, its usefulness is not confined to that field. It is possible to make it portable on almost any system so that a supply of air would be available for pneumatic tools. It is made in capacities of 147, 218 and 314 cu.ft. of free air per minute.

Milwaukee's Three-Truck, Two-Man Train Declared Successful*

General Plan of Construction of This Unique Equipment, Operated on Combined Urban and Interurban Property, Is Described and Other Experiences in Various Train Operation Related—Some of the Advantages Are Economy in Platform Labor and Increased Flexibility Over Single-End Trains Both in Service and at Carhouses

By S. B. WAY
Vice-President and General Manager Milwaukee (Wis.) Electric Railway & Light Company



MILWAUKEE'S THREE-TRUCK, TWO-MAN TRAIN BUILT FROM TWO OLD DOUBLE-TRUCK CARS

FOR a number of years electric railways have found it very difficult to obtain capital for new construction. Managements faced with the necessity of effecting every operating economy possible without a reduction in the quantity of service, and unable to spend money for new equipment, even though operating economies would certainly result, have found this necessity truly the mother of invention. The problems to be solved were: (1) To run more service through sections already congested to apparent capacity; (2) to do this with fewer trainmen; (3) to do this with smaller expenditures for power and for maintenance of tracks and cars; that is, to reduce the car weight per unit of capacity; (4) and finally, and this is controlling, to do the job without spending any money.

This problem had to be faced in 1917 to 1920, when equipment prices were advancing from twice to three times the values obtaining at any time in forty years. The problem, of course, has not been completely solved. Various attempts have been made with varying results. Perhaps a brief review of the experiments made over the course of several years in Milwaukee will be of interest.

The Milwaukee system is a combined urban and interurban property. In the operation of its interurban system the company has for many years operated interurban cars in trains, always, however, concentrating the power in one unit and employing two, three and even four plain trailers for the remaining units in each train.

In 1912, incident to a general plan of revamping and modernizing its old urban equipment, advantage was taken of the opportunity to regroup the motors on certain cars, making such cars capable of pulling trailers and at the same time avoiding the necessity for purchasing as much motor equipment as would have been necessary had all cars been re-equipped with motors. The experience on the interurban system naturally suggested that, in constructing trains, the second car should be a plain trailer and be pulled behind a suitable motor. During the years 1912 and 1913 all but seventy-two of the company's older types of cars were thoroughly overhauled and re-equipped, and fifty-four of these cars were stripped of motors, controllers, trolleys, etc., and arranged with detachable couplers and suitable light wiring and air connection, to permit them to be operated as trailers. As the system and all of the single-car units were arranged for double-end operation, it was necessary to make certain special track arrangements for the operation of these single-end trains around loops. These loops were generally placed some distance short of the ends of the lines upon which the trains were scheduled, resulting in short-route operation of the two-car trains.

Experience with these fifty-four trains developed, of course, some economy in platform labor, but cost of loops and the lack of flexibility of the single-end trains, both on the system and in the car stations, deterred the management from extending train operation for some time thereafter. In the light of more recent experience it is difficult to understand why the cars were entirely stripped of motors and power wiring, controllers and trolleys and a less convenient and more expensive method of operation chosen. It would have been somewhat cheaper to arrange these same cars for double-end operation in two-car trains, thus making them available for use anywhere on the system with equal flexibility with the single-car units.

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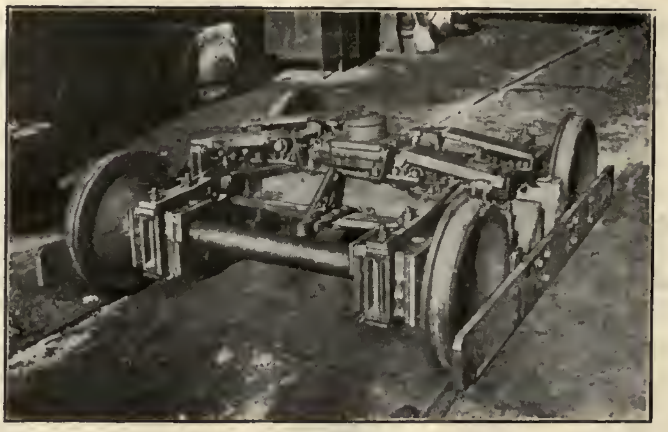
*Abstract of paper read before joint meeting of A. I. E. E. and W. S. E., Chicago, Dec. 17, 1920.



SPECIALLY CONSTRUCTED CENTER TRUCK HAVING INSIDE JOURNALS FOR USE ON THREE-TRUCK TRAIN

No further progress was made in the development of train operation in Milwaukee until about 1916, when the company undertook to build in its own shops fifty new cars of the center-entrance and exit and front-end exit type. These cars were equipped with two motors, maximum-traction trucks and multiple-unit control, with a view of operating in two- or three-car trains. In choosing these cars the advantage of double-end operation of the trains was recognized, although considerable additional expense was incurred in arranging the cars for both single-unit operation and train operation, which might have been saved by arranging them for train operation only. These cars operated in trains afforded further economy in the use of labor. The last of these cars were placed in service at the beginning of the year 1918.

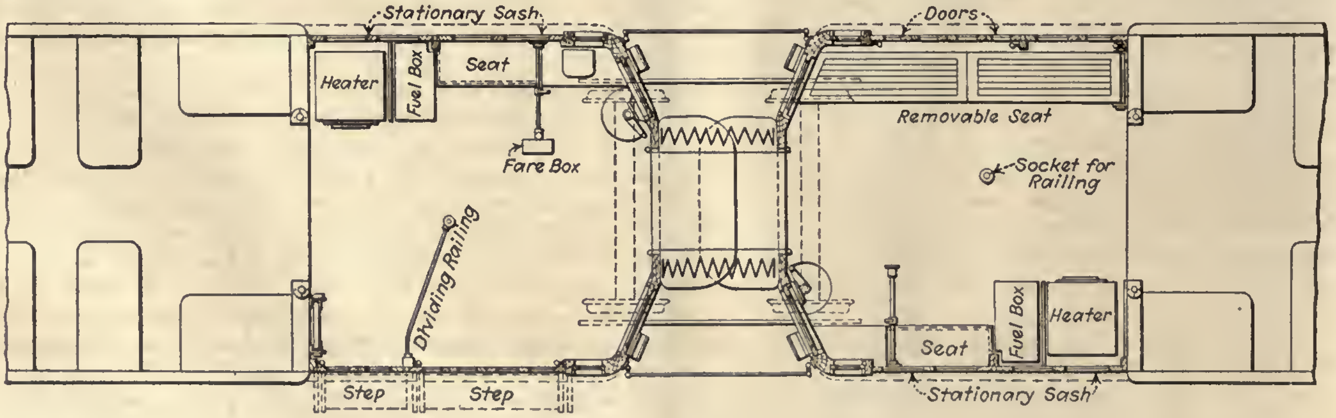
The demonstrated advantages of double-end train operation, of course, suggested the idea of coupling up existing equipment where possible to achieve further economy in the use of platform labor. The company had a certain number of old cars more or less modernized which were equipped with two motors each. The controllers, standard on the property, are readily capable of handling four motors. The next development involved merely putting pairs of these cars together with permanent coupling, rearranging the wiring and carrying it through on the permanent coupling bar, stripping each car of one trolley and one set of air and electric controls and removing one air compressor. Cars so put together operated perfectly as double-end two-car trains.

While this development was going on, war conditions were rapidly advancing the cost of labor and material and platform labor was becoming extremely scarce, even though wages were rapidly advanced. Seventy-two of the oldest cars owned by the company and which had been excluded from the original program of reconstruction and modernizing had by this time become sorely in need of general overhauling if they were to be kept longer in service. Under ordinary circumstances it is probable that these cars, on account of their extreme age, would have been scheduled for retirement from service. Under war conditions this treatment was of course out of the question. The problem presented was how to treat these cars, incident to the necessary repair and reconstruction, so as to derive the maximum benefit from the expenditure. It was reasoned that if double-end, two-car trains operated by three men were advantageous, as compared with single-unit operation with two men per car, a two-car train arranged to be handled by one conductor would be even more advantageous. This point was emphasized by two considerations, namely: (1) Scarcity and high cost of platform labor; (2) difficulty of making tripper runs attractive to men without payment of excessive bonus time.

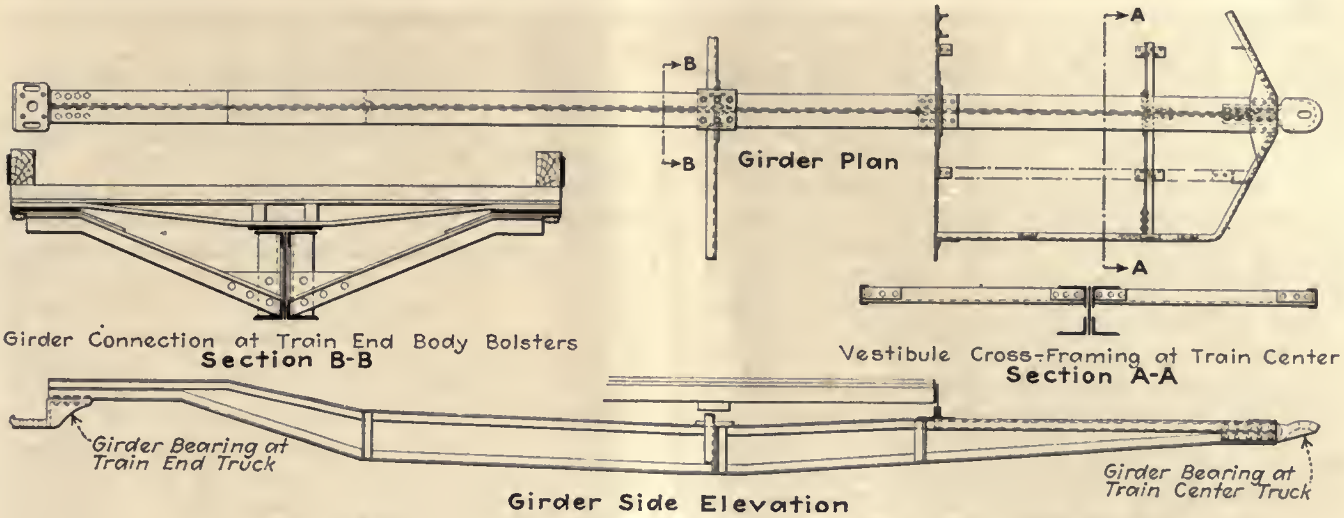
CONSTRUCTION OF THE THREE-TRUCK TRAIN

To handle a two-car train with one conductor in city service requires, of course, that the passengers be allowed to pass freely from one car to the other while the cars are in motion and rounding curves, etc. This requires the careful articulation of the cars and the elimination of all possible motion and displacement of the two car bodies at the point of connection. It also requires the location of the conductor at a point to control the admission of all passengers and the exit of all passengers from the rear car. This became virtually the same problem as that of the location of the conductor in a large center-entrance car. All of these requirements pointed to the connection of the two cars with minimum amount of space at the adjacent platforms and the support at that point of a single truck.

In adapting these old cars to these conditions it was necessary to support the old car bodies in substantially the same manner as they had been previously carried upon individual trucks, namely, at the car body bolsters. This was accomplished by placing under each car an auxiliary steel underframe beginning at the outer truck bolster and continuing through to the point of joining the two car bodies together. By suitable design, this steel underframe carries the weight of the car at the



FLOOR PLAN OF CENTER PLATFORMS


Girder Plan
B
B
A
A
Girder Connection at Train End Body Bolsters
Section B-B
Vestibule Cross-Framing at Train Center
Section A-A
Girder Bearing at Train End Truck
Girder Bearing at Train Center Truck
Girder Side Elevation

DRAWING OF SPECIAL GIRDER USED UNDER EACH CAR IN THREE-TRUCK TRAIN

old car body bolster, provides adequate support for a greatly enlarged platform and transmits the load to the center truck, where a kind of ball and socket joint arrangement on the ends of the two main auxiliary girders permits both to rest and pivot on the center-truck kingpin and bolster.

The enlarged platforms were desired in order to provide space for the larger number of passengers to be handled and to accommodate the heating equipment. The platforms were connected by overlapping steel plates attached to the platforms, and arranged to permit the necessary joint movement on curves. The vestibules were connected by diaphragm. The motors of the cars were regrouped on the outer trucks, giving the train the same motor power as cars possessed when individually operated, and, accordingly, the same speed and power when arranged as a train.

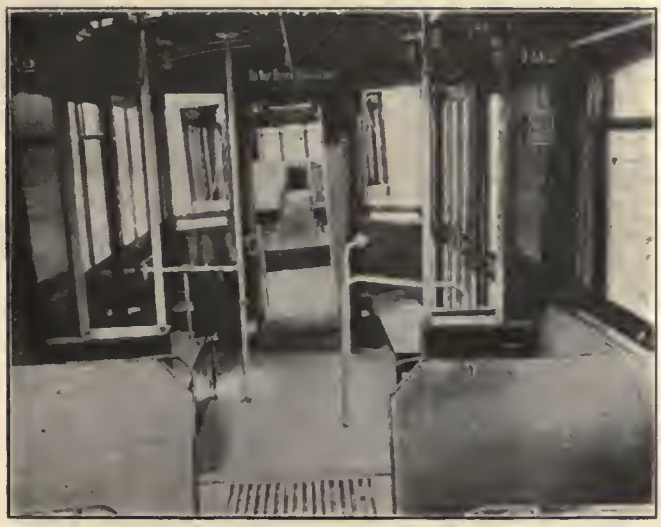
In the actual reconstruction of these old cars into three-truck trains it was found possible to increase the combined seating capacity from 84 to 106 in summer and from 80 to 102 in winter, and the standing capacity an even greater percentage. The old car bodies were greatly strengthened by the use of the steel underframes. There were recovered from each pair of cars two trolleys, two sets of air and electric control, one air compressor, two standard trucks, besides various minor equipment, such as destination signs and headlights. And notwithstanding the addition of the third truck, new steel underframes and enlarged platforms, the total weight of the finished train is only slightly more than the combined weight of the individual cars.

On account of the exposure of the center truck, particularly on curves, it was found desirable to reduce the lateral dimensions of the truck and necessary clearance to a minimum. This was accomplished by building a special truck having inside journal boxes. A picture of this truck is reproduced herewith.

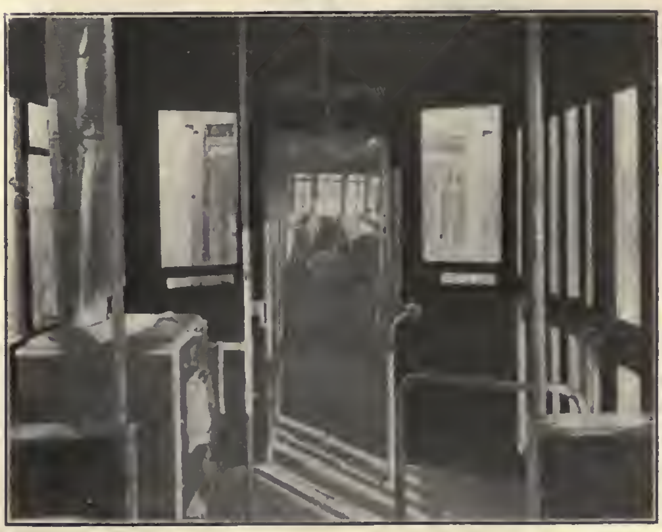
ADVANTAGES AND DISADVANTAGES OF THE THREE-TRUCK TRAIN

Experience has shown that these three-truck units have the following advantages:

1. Utilization of old obsolete equipment in a manner making it entirely acceptable for rush-hour service and for other special service, as well as for regular service on very heavy lines where the traffic justifies the operation of units of this size.
2. Economy in platform labor.
3. Adaptability for operation as either straight pay-as-you-enter or as a combination pay-enter and pay-leave system.
4. Better control of distribution of passenger load.



CENTER PLATFORMS, LOOKING FORWARD, SHOWING PLATFORM SEATS AND PASSAGEWAY BETWEEN CARS



CENTER PLATFORMS, LOOKING BACKWARD, SHOWING ARRANGEMENT OF STANCHIONS AND LOCATION OF HEATER

The disadvantages of the these units are:

1. Difficulty of locating the trolley stand so as to be accessible to the conductor and yet avoid frequent leaving the wire on curves. Where electric switches are not operated, the preferable location of the trolley is over the rear truck. On a system operating single-car units and electric switches it is necessary to employ a special swiveling trolley which in practice follows the wire substantially as well as the standard trolley mounted over the car truck. It requires, however, to be equipped with two ropes in order to handle it around the diaphragm connection between the cars.

2. Slowness in loading, as compared with single-car units. The same objection, however, would apply to increasing the size of single cars. In Milwaukee operation this disadvantage is of no moment, as street fare collectors are employed at all congested corners to facilitate operation of all types of trains and single-car units during the rush hour.

In the particular case of reconstructed old cars into three-car trains these general results were achieved:

1. The winter seating capacity was increased from 40 per car to 102 per train, or 27.5 per cent.

2. The weight per seated passenger was reduced from 913 lb. to 735 lb., or 19.4 per cent.

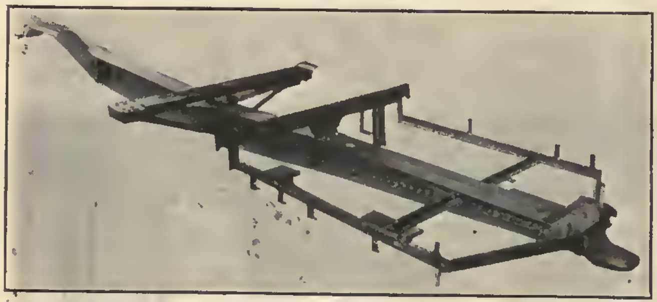
3. Rush-hour capacity (as determined by standards of the Wisconsin Railroad Commission) per trainman increased from 30 passengers before reconstruction to 76 passengers, or 153 per cent.

4. Rush-hour capacity per trainman increased 31 per cent, as compared with largest two-car, three-man trains operating at same service standard with fifty-eight passengers per man.

5. Power consumption per passenger under rush-hour capacity reduced 26.6 per cent as compared with the same cars operated singly before reconstruction.

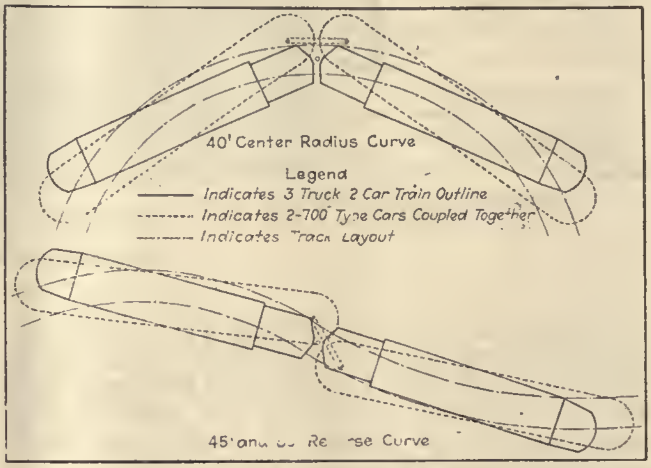
6. The net cost of providing the increased rush-hour capacity did not exceed $72 per passenger, or less than one-half the cost per passenger of purchasing the cheapest character of new equipment.

In general the train has proved satisfactory in operating characteristics. Thirty-three of these trains are now in service, the first one having been operated fourteen months. The passengers accepted the trains without comment or notice. They have attracted no special attention from the local public or the press. The trains keep their place on the road and do not get behind schedule to as great an extent as three-man trains.


SPECIAL STEEL GIRDER UNDERFRAME CONSTRUCTED UNDER EACH CAR TO PROVIDE MAIN SUPPORT FROM CENTER TRUCK TO EITHER END TRUCK

With three-man trains the passengers show a preference for the first car in the ratio of about eight to five. With the three-truck train there appears to be no preference shown, but this may in part be accounted for by the fact that the conductor has an opportunity to control the distribution of the load.

The gross cost of converting the old cars into three-truck trains, including thorough overhauling and repair of old bodies and trucks and enclosing the old semi-open platforms, averaged about $3,000 per pair. The conservative value of the equipment recovered is more than $900. The net cost of converting these very old and obsolete and rather small cars into attractive trains which are economical and satisfactory for operation for many years to come is returned through direct saving in platform labor alone in less than one year.


40' Center Radius Curve
Legend
Indicates 3 Truck 2 Car Train Outline
Indicates 2-700 Type Cars Coupled Together
Indicates Track Layout
45' and [illegible] Reverse Curve

COMPARATIVE CLEARANCE DIAGRAMS OF THREE-TRUCK TRAIN AND ORDINARY TWO-CAR TRAIN ON CURVES

No careful study has been made to disclose the further economies which might be achieved in constructing three-truck trains entirely from new materials. It is certain, however, that substantial gains would be possible in respect to weight, power consumption and first cost as compared with providing the same capacity in single cars or in two-car trains of the multiple-unit type. The cost of a three-truck train should not exceed the cost of a motor car and trailer of equivalent carrying capacity but requiring three men to operate.

GENERAL CONCLUSIONS

Experience in train operation on surface lines leads to the following general conclusions:

1. A comparatively large number of trains may be operated advantageously on any fairly large urban system. The maximum number that may be so operated depends on local conditions, but in general may be taken as being equal to at least 80 per cent of the rush-hour trippers. From a traffic standpoint it would be possible to operate 100 per cent of the trippers in trains. Extra single cars for scheduled inspections and washing, but available for rush-hour service, accounts for the lower percentage of trippers in trains which can be operated in practice. Figures from the Milwaukee system, given above, will illustrate the point.

Total cars owned	600
Total cars scheduled maximum rush hour	566
Total cars scheduled maximum non-rush hour	254
Total single cars	336
Total cars in trains	264
Single cars for shop	24
Single cars for regular inspection and washing	58
Single cars available for rush hour	312
Cars in trains for shop	10
Cars in trains available for rush hour	254
Ratio cars in trains to total cars	44 per cent
Ratio cars in trains to single cars	78.6 per cent
Ratio cars in trains to rush-hour trippers	81.4 per cent

2. Trains load somewhat slower than single cars, but this disadvantage is largely overcome by using street fare collectors. Whatever disadvantages exist are small in comparison with the advantages derived from economy in platform labor and track space.

3. Cars in trains are economical and satisfactory for many classes of special service such as baseball, theater crowds, picnics and the like. In such cases loading and unloading time is relatively unimportant, particularly where cars are standing between going and returning loads.

4. In rush-hour and special service the distortion in headway is not important as cars run close together in any event.

5. The use of a substantial percentage of the total equipment in trains assists greatly in working out good runs for the men, also in reducing the number of extra men and payroll time not worked. The more rigid the agreement or rules under which the men work respecting percentage of straight runs, limits on spread of duty and extra time for overtime the more advantageous train operation becomes from the labor standpoint.

6. It is practicable to operate an unmotored unit of a train either ahead or behind the motor car. The control is easily carried through and the train operates as well in one direction as the other. This is of importance mainly on systems which operate double-end. Double-end trains are, of course, easier to handle in car stations and admit of short routing without loops.

7. It is not desirable or necessary to couple and uncouple trains daily or even frequently. Automatic air and electric couplers are expensive and any other kind involve serious hazards in operation. Couplers must swing through a long arc and even if automatic, as far as making connections is concerned, they must be handled with extreme care if frequent injuries to hostlers and other employees are to be avoided. About the only excuse for the use of readily detachable couplers is to enable one car of a train to continue in service if the other is disabled. A non-detachable coupling greatly simplifies and cheapens the making of trains from single units.

8. It is important to use folding steps and platform-inclosing doors in train operation in the interest of avoiding accidents to passengers who attempt to board or leave the leading car while in motion.

Duties of Bridge and Building Inspectors

A Standard Form for Instructions Is Given for the Guidance and Information of Inspectors, with the Salient Features of Their Duties—Importance of Properly Trained Men Recognized

By HOWARD H. GEORGE
Engineer Maintenance of Way Public Service Railway of New Jersey

THE Public Service Railway of New Jersey long ago recognized the importance of properly trained men for performing inspection work and standard instructions were compiled which were the result of very careful study of the requirements for the particular class of work under consideration. Sometimes new men are employed whose experience has been rather limited in the particular field in which they are placed and such men must be trained for the requirements of their new positions. Some men are more apt than others and absorb and retain information more readily. Individual instruction is desirable in many cases where special considerations are involved, but this frequently results in a duplication of work on the part of whomever may be in charge, and verbal instructions are frequently forgotten by the inspector. More often, the engineer in charge will unintentionally neglect to give the proper instructions on points to which it is essential that special attention be given, and there is very frequently a decided lack of uniformity in the instructions issued to different men on the same class of work. This practice, in many cases, leaves entirely too many questions to the individual judgment of the inspector, and where the experience of the latter has not been very broad this is liable to lead to difficulties.

In this article is reproduced a standard set of instructions which have been in use a number of years for the guidance and information of inspectors on building and bridge construction. The advantage of having such standard instructions to turn over to such men is that during the few spare minutes that may present themselves the inspector has an opportunity to refresh his memory as to what is required and expected of him. The salient features of his duties are more apt to be impressed on his mind, and it relieves him of uncertainty and avoids many delays to the work which would otherwise occur while he is awaiting definite instructions. When arranged in convenient pamphlet form they can be readily carried and referred to from time to time. In addition, the engineer or architect in charge of the work is relieved of some of his worries because he is assured that his inspectors have at least been properly instructed. The following instructions will be of service in such cases.

Information for Building and Bridge Inspectors

Carefully study all plans, elevations or other drawings, and also all specifications, and see that the drawings are in conformity with each other and with the specifications.

Check all figures and dimensions on plans and details; check shop details as they are received to see that they do not conflict with scale drawings; also check all erection drawings in order to recommend some other procedure in an emergency should the necessity occur; also see that the specifications or special intentions agree.

Keep on the work in an accessible location special copies of all drawings, details and specifications, and carefully note on same any changes from the original plans, so as to keep a complete record of the work constructed.

Familiarize yourself with all local conditions or ordinances affecting the work and see that the same are rigidly adhered to.

Make the acquaintance of and keep in touch with the general contractor and all sub-contractors or other principals engaged on the work.

Establish diplomatic relations with adjoining property owners or residents, and see that all their rights are respected by the contractors.

Acquaint yourself with all traffic arrangements, whether regular or special, that may interfere in any way with the progress of the work.

Secure full information concerning the conditions of steel work being fabricated in the mills or shops; also of any other materials that may be under the course of construction, and ascertain the names of all contractors for same, date of orders and the probable date of shipment, and if necessary closely follow up same in order to secure proper delivery.

Should any incomplete work be fabricated that will need attention and correction at the site carefully look out for and see that all corrections are made before same is incorporated in the structure.

MATERIAL SHORTAGE CAN BE PREVENTED BY CAREFUL CHECKING

Keep a record of the arrival of all materials. The contractor's record should be sufficient, if suitable, but should be carefully checked. Strive to anticipate any shortage of material and use all available facilities to hasten delivery; also arrange for the proper storage of same on the site.

Try to anticipate the need of detail drawings and notify the engineer or architect regarding same.

Study the progress of the work and try to determine whether it will be completed in the specified time, and, if in your opinion it will not be finished as specified, endeavor to secure such additions to the force and equipment as will secure completion within the allotted time.

See that the company's photographer is kept informed as to the progress of the work and that "progress photographs" are taken at least every ten days.

Keep a daily record of the force employed and the distribution of labor in such a manner as will clearly show the progress of the work, and also of all equipment in use at all times.

When "unit prices" are called for make a careful report of the cost of all material and labor which are included in same, separating the two items.

NEVER INTERRUPT SERVICE WITHOUT NOTIFYING TRANSPORTATION DEPARTMENT

Where necessary to interrupt regular car service see that sufficient notice is given the transportation department. Have full preparations made beforehand, so that such interruption shall be as short as possible and will occur at such a time as will least interfere with normal operation. Make a record of all delays to operation caused by such work; also see that proper signals are displayed for the protection of cars.

Keep in close touch with the office and designing engineer or architect and consult with them frequently as to the interpretation of all drawings or specifications.

Exercise a constant supervision of any sheath piling, underpinning, forms for concrete, or any other false work or temporary structure, and see that same are properly maintained and not removed until all masonry is set.

Keep careful account of any extra work in order to be able satisfactorily to explain and check all extras. Keep a daily record of the progress of the work in a separate field book for each job. Note the same, and, if any disputes arise, their settlement; also note variations, if any, from the plans or specifications. At the completion of the work see that all plans and specifications are corrected to agree with the work as constructed and make a final report showing costs where required.

Make careful preparations so that erection may proceed rapidly and that the period of any disturbance or delay may be reduced to a minimum.

See that all piping or sleeves for same are built through walls and that all other piping, conduits, drains or ducts called for in the plans are placed in the proper position and before any floors are laid or masonry constructed; also see that all chases or recesses are left in walls to receive piping, etc.

See that the substructures are placed and constructed in a manner that will conform to the steel plans.

Where piles are used in the foundation, the inspector shall see that they are properly driven and that they are cut off at the correct elevation.

PROPER SHORING WILL PREVENT TROUBLE FROM SHIFTING EARTH

Carefully observe all surface and subsurface conditions and see that all excavations are shored or sheet-piled where necessary. If surface drains are necessary see that same are installed in advance of masonry. Be sure that all waterproofing is thoroughly jointed and lapped. Do not allow back filling against green walls unless same are braced; also see that all back-fill is well puddled.

See that the grades of pipes are uniform and properly supported, and that all plumbing work conforms with the requirements of the local authorities. See that all joints are carefully made and watertight.

Where concrete is required, see that the proper proportions are used and that the materials are up to the specifications. See that all reinforcement is placed in its proper location and held in such a manner that the placing of the concrete will not disturb it.

Where blasting is necessary see that the proper protection and warning is given to the public and to the cars operating in the danger zone, and that it is done at such a time as to cause the least interference with operation. The charges are to be so regulated and covered that no damage will result.

See that all machinery and boiler foundations are built true to detail. See that all stone or terra-cotta work is perfect before same is placed in the work, and also see that all brick or other mason work is laid and anchored as specified. Be careful to see that all concrete work, whether reinforced or otherwise, is constructed as specified in all particulars.

See that all furring is in place and firmly secured before plaster work is started, and that sufficient time is given between coats, and that a proper backing is prepared for all tile and marble work.

See that all work is carefully aligned and accurately fitted. Closely watch the painting of all work.

Carefully examine all work before same is installed. See that all framing is accurately made and anchored and that all roughing and furring is built in. All finished work should be carefully inspected as to design, finish, etc. If necessary have a "mill inspection" made. Trim must not be applied until plastering is dry. See that all hardware is properly attached, including that to metal-covered work.

See that all flashings are carefully built in.

Be constantly on hand when work is in progress and note any damage to the metal, failure to conform to the specifications, or any special difficulty in assembling.

Make sure that each member of the structure is placed in its proper position. If match marks are used examine them with care. Endeavor to have the several members assembled in such order that no unsatisfactory makeshifts need be resorted to in getting some minor member in place.

Watch carefully the use of fillers, washers and threaded members to see that they are neither omitted nor misused.

Make certain that all parts of the structure are properly aligned and that the required camber exists before riveting. It is possible for a structure to be badly distorted although the rivet holes are well filled with bolts.

Watch the heating of rivets to insure against overheating and to make sure that scale is removed.

Examine and test carefully all field-driven rivets and have any that are loose or imperfect replaced.

Have cut out and replaced all rivets whether shop-driven or field-driven that may be loosened during erection and riveting.

Prevent injury to metal while removing rivets.

A careful and complete record in detail must be kept of the cost of all alteration or repair work wherever work of this nature occurs in any part of the construction; also a detail of the estimated cost to reproduce any and all structures that may be torn down, removed, or otherwise destroyed shall be kept, and a report in full sent to the engineer or architect immediately.

A careful check should be kept at all times of the amount of money being expended, and if there is any indication of a likelihood of the amount authorized being exceeded, notice thereof shall be given the engineer or architect immediately.

Financing Public Service

President Gadsden Shows Relation of Credit Restoration to Rate Adjustment, Delayed Due to Lack of Knowledge by Public—Says Utilities Should Give Full Explanation in Understandable Terms

URGING a complete, simply worded program of public information, with all facts disclosed as a means of restoring credit, President P. H. Gadsden of the American Association addressed the Indiana Public Utilities Association, at Indianapolis on Jan. 13, on the subject of "Public Service Financing." After reciting the war troubles which led to the appreciation of the necessity of public utilities and of the mutual dependence of all industries and emphasizing the financial straits of utilities in spite of this, he pointed out the layman's difficulty of understanding this when he sees other industries prosperous. He then proceeded to outline the situation as follows:

"It is only natural when a business is in difficulties that one should look first to the management to discover if therein lies the chief trouble. To such an investigation the public utilities of the United States can freely submit themselves without fear of the result. While there may be, and doubtless are, isolated cases of bad management in the business throughout the country, for, indeed, no industry's management is 100 per cent perfect, it is safe to say that on the whole the public utility properties are managed with as high a degree of efficiency as any other lines of business in the world. Hence they must be discharged on that count.

"From considering the management it is a very natural step to the cost of supplies, and turning to them we find that the coal, oil, rails and other supplies of public utilities are purchased in the same market as are those of other industries and at the same price. It follows then that here is no unusual situation.

"Again it is not a lack of business that is to blame for the public utility situation because the demands on their facilities never have been greater. Electric railways have all the traffic that they can carry. The demands on gas, electric light and power companies are unprecedented, and from every section of the country comes the declaration that the capacities of telephone and telegraph companies are severely taxed and that obtaining a sufficient quantity of new supplies to handle new business is one of their greatest problems.

REGULATION INTERFERES WITH LAW OF SUPPLY AND DEMAND

"In the face of this situation, then, it is obvious that there is some one thing which differentiates the public utilities from other classes of business. Somewhere there is a difference in operation which has created the broad and gradually widening chasm between prosperity and ruin. To the practical public utility operator the cause is plain.

"It is the regulation of public utility rates that is the basic cause of their troubles.

"The laws of supply and demand which normally should regulate public utilities are artificially interfered with. The natural operation of these laws are so checked and diverted that they operate only on the expenses of public utilities and not on their receipts.

"It is unfortunate, but it is true, that the fact that public utility rates have been fixed by commissions and not by the law of supply and demand has gradually impressed the public with the idea that the whole field of public utilities is removed from the operation of economic laws."

Tracing the rise in prices of all supplies and the necessary rise in labor prices, Mr. Gadsden said that proportionate advances in rates should have been made simultaneously, and then proceeded to say:

"The results of this inequitable advance in payment for services rendered has been that public utility companies throughout the United States today are in financial difficulties and many street railway companies are in bankruptcy. Credit of gas companies is greatly impaired and it is with the utmost difficulty that new money can be obtained to make the necessary and required extensions which every gas company must make continuously if it proposes to give good service to growing communities."

As a cause for what he termed "this chaotic situation," Mr. Gadsden pointed to the rigidity of the present system of regulation. This, he said, is a defect. The system is devoid of easy flexibility which would enable it to meet emergencies such as those created by the war.

COMMISSIONS HAVE RESPONDED ABLY

"The trouble lies very largely in the system itself and is not the fault of the commissions that regulate public utilities. The Public Utilities Commissions of this country are filled with honest, capable, conscientious men who are striving diligently to do their utmost to relieve public utilities of their great and sometimes seemingly insurmountable problems. Generally speaking, these commissions have responded to the very best of their ability to the demands of the situation. But the fault in the regulatory system lies beyond their power to remedy.

"The great need in the public utility field today is credit and this need links up directly with rate adjustment.

"It is absolutely necessary if public utilities are to continue to function that they must establish new credit and create a flow of new capital into their securities. The answer to this whole problem is the granting of rates to public utility companies which will insure a return to the security holders that will induce them to invest. Nothing less than this sort of an arrangement will save the public from ruin.

"Adjustment of public utility rates to a basis that will attract new money into the field will be hastened by a thorough public understanding of the public utility problems.

"The best way to bring about that understanding is to be frank and advertise.

"Frankness must go hand in hand with advertising else advertising fails. Therefore, be prepared, when you begin presenting your story to the public, to tell the whole truth about your business to every one. As the only customer of the public utilities, the public is entitled to know all about their business, and any public utility which cannot stand the searchlight of honest public inquiry cannot hope to obtain help through favorable public sentiment. Put your house in such order that you will fear the questions of no man.

"Advertise by every possible channel and hit the line hard. Tell your story in electric railway car cards, in the display advertising columns of the daily newspapers, through your employees—tell it everywhere that there is blank space which you can fill.

"Present your facts simply, frankly and honestly. Make it plain that the public utility problem is the problem of every man, woman and child who uses your service. Strive by frank statement to convince consumers that you are trying to do the best thing for their general good and that in their own selfish interest, if nothing else, they should interest themselves in your efforts. The way to accomplish this result is not to make the flat statement that this is your intention, or to submit to the public a large indigestible volume of statistics, and then sit down and wait for the millennium. The thing to do is to explain your situation in understandable terms to just as many folks as possible. If you have a good case, as most public utilities nowadays have, and you will tell the whole truth about your situation in a simple and convincing manner and give it deserving circulation through the best available advertising medium, you are certain to rally the public to your support."

Fighting Snow on the Milwaukee

Division Master Mechanic in Charge of Equipment on the Rocky Mountain Electrification Tells How the Track Is Kept Open—Snowslides Are the Greatest Enemy of the Snowplow

ONE advantage of the electric over the steam locomotive in cold and snowy climates is the greater ease of keeping the tracks clear of snow. This, among other points, is explained in the current issue of the *Electric Journal* by E. Sears, division master mechanic Chicago, Milwaukee & St. Paul Railroad. He states that a moderate depth of snow, 4 to 5 ft., unless it is heavily packed, and even greater depths extending for only a short distance, can be removed most easily by means of the wedge type snowplow. The railroad has a number of double mold board Barr plows of this type, which are placed ahead of loaded ballast cars and driven at high speed through the snow by two or three locomotives. These are usually able to take care of the snow situation in the Rocky Mountains, as the snow does not usually attain as great depth in this territory as in the coastal ranges. When fighting snow in this manner the members of the crew are continually wet from the snow which is melted by the heat of the locomotives. Snow is necessarily shoveled into the firebox with the coal, making steaming difficult. A considerable gang of laborers with snow shovels is usually carried for use in emergencies.

For deeper snows the railroad employs six rotary plows, mostly in the Bitter Root and Cascade Mountains. The plow is pushed ahead of the locomotive, boring its way through the snowbanks. The rotary wheel is about 12 ft. in diameter. It is faced with knives, which cut into the snow; this is thrown by centrifugal force out of the chute at the upper part of the housing. The snowslides are the greatest enemy of the snowplow in the mountain district, as they cover the tracks to considerable depths; at times they catch a plow and bury it completely. In one case one of the electric locomotives without a rotary plow attached ran into a large drift and several visiting electrical engineers who were on the locomotive were entirely buried in the snow, which forced itself through the broken windows and filled the cab.

Prior to the electrification, as many as three or four steam freight locomotives were placed behind the rotary plow. Now the rotaries are handled by one electric locomotive and, inasmuch as each half of the present freight locomotives, when not coupled to the other, can be run as a separate unit, only one unit of the engine is sometimes employed, although in heavier drifts both units can be cut in, giving full power to push the snowplow.

The heavy snowfalls do not interfere with the electrical operation over the mountain territory as much as they did with steam, since an electric engine will plow through snow where a steam engine will not go. The heavy snows have no bad effect on the overhead wiring. At times heavy frost collects on the two No. 0000 copper trolley wires. With a pantograph of the double-shoe type, sliding on two trolleys whose hangers are spaced alternately, excellent current collection is obtained at all times and sleet and frost have not so far caused trouble to any extent. Sometimes during heavy frosts both pantographs are raised, the front one serving principally to clear the wires.

Experience indicates that snow fighting can be done better with electrical equipment than with steam. The electrical equipment gives better speed control, as there is no difficulty in securing all the power desired and there is no opportunity for the freezing up of injector pipes, etc., on the locomotive, or necessity of having to go back for water or fuel, except to meet the fuel and water demands of the rotary plow itself.

The only change necessary to adapt the rotary snowplow to use in the electrified territory was the attaching of a deflector on the upper part of the rotary hood, so that the snow and other material, when thrown out, would not come in contact with the power limiting and other wires. These are at such a height that a rotary, in its original condition, would throw the snow onto the wires, and trouble was experienced from this cause when the rotaries were first operated in the electrified section.

Mr. Sears concludes with the statement that, no doubt, in the near future rotary snowplows will be built with electric motors instead of steam engines for electrified territory, and the old ones will be changed over for electric operation. The only drawback to operating the plow itself with motors is that quite often the rotary wheel will freeze, in which case it is necessary to have steam available to thaw it out. This difficulty could be overcome by using a small boiler similar to the ones which are now being used for heating the passenger trains.

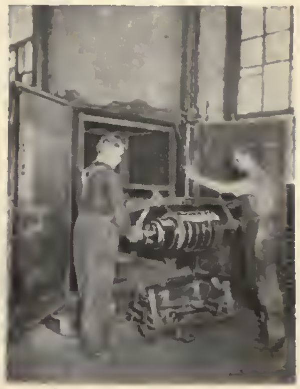
New England Club Meets

TWO meetings were held at the American House in Boston by the New England Street Railway Club on Thursday, Jan. 6.

In the afternoon Col. Thomas F. Sullivan, former roadmaster of the Boston Elevated Railway and now Commissioner of Public Works, city of Boston, gave a short talk on "Snow Fighting." There followed a discussion of some length on this subject by various railway managers of New England roads, after which dinner was served. The evening meeting was in the nature of a reunion. Many of the past-presidents of the club were present and gave short talks on the growth and accomplishments of the club during its twenty years of existence.

Shop, Track, Power and Line

These Articles and Ideas Are from Men on the Job Who Find Special Applications and New Methods an Incentive for Greater Effort — If You Have Something Good Pass It Along



Broken Switch Casting Reclaimed by Electric Arc Welding

An Ingenious Method of Repair Used by the New York Railways on a Broken Switch Casting Which Made It Practically as Good as New and Accomplished It at a Substantial Saving

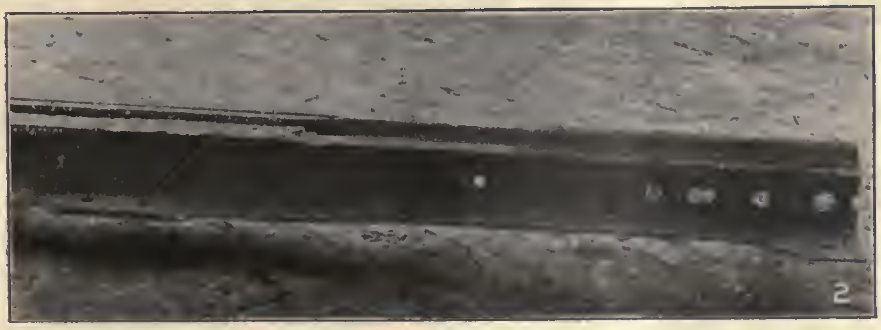
BY A. MCGREGOR
Chief Engineer Arc Welding Machine Company, New York

A RIGHT hand standard switch casting which had seen service on the New York Railways system as a one way switch at Fifty-ninth Street and Sixth Avenue for a number of years finally became so badly worn and broken that it had to be removed. It was found that at a place about half the length of the switch point, where the car wheel started to bridge the switch tongue and the running rail, to the end of the casting the running rail was worn to a maximum depth of approximately 7/8 in. At the end of the casting the splice plates were broken, and the rail had been so weakened by wear that the head of the running rail was broken off for a distance of 27 in. from the end. A somewhat similar condition was found at the heel end of the casting. Not only was the head of the running rail worn and a section 20 in. long broken off but the gage line of the running rail was also worn away for approximately 3/4 in.

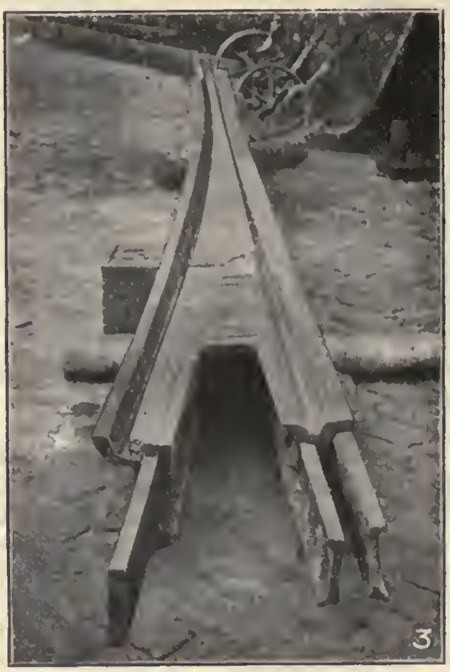
A short time ago this casting would have been scrapped. In fact, some of the less progressive roads still scrap such sections, but the maintenance of way department of the New York Railways was equal to the occasion. It removed the section to the yard and by using an electric arc-welding machine built for it by the company with which the writer is connected, it not only reclaimed the casting, making it practically as good as new, but also accomplished it at a saving of approximately $350.

METHOD USED FOR REPAIRS

It was interesting to see the ingenious manner in which the repair was made. At both ends where the running rail was broken a steel plate 1 x 5 in. was arc welded solid to the web and another piece of steel 1 x 2 in. was arc welded to the top edge of the plate to form the head of the rail. The plates were prepared long enough so that they extended approximately 16 in. beyond the end of the rail, thereby forming a splice plate on one side of the web at each end.



No. 1. Switch casting reclaimed by electric arc welding.
No. 2. Toe end of casting, showing section of running rail, 27 in. long broken off. Also showing worn section of running rail built up by the electric arc (partly finished).



No. 3. Heel end of casting, showing how worn and broken section was repaired. Note the steel plate which forms the head of the running rail and also the splice plate. Observe how the gage line of the running rail was brought back to normal.

COST OF RECLAIMING BROKEN SWITCH CASTING

Cost of new casting complete		$500.00
Cost of repairing old casting,		
51 hours welding 18 hours grinding	$42.78	
35 lb. $\frac{3}{16}$ in. electrodes (hard steel)	14.35	
40 lb. $\frac{3}{16}$ in. electrodes (mild steel)	7.40	
200 lb. 1 in. x 7 in. rolled steel plates	20.00	
30 cu.ft. acetylene for cutting	.90	
100 cu.ft. oxygen for cutting	1.30	
New switch tongue	78.00	
		$164.73
Actual saving by electric welding	$335.27	

The top and inside edges of the plates were built up with steel by means of the electric arc, until the head of the rail was brought back to normal. For a depth of approximately ⅜ in. from the top a layer of special hard grade steel was used. Where the rail was worn but not broken the surface was built up with mild and hard steel, until, after grinding, all sections were brought back to their original dimensions. No attempt was made to weld the switch tongue. It was simply replaced with a new one. The switch casting was made by the Lorain Steel Company. The center section of the rail is of manganese steel and is keyed into the steel casting.

PORTABLE TWO ARC ELECTRIC WELDING MACHINE USED BY THE NEW YORK RAILWAYS

The writer was informed that this is only one of a number of cases where the use of electric arc welding has saved the company considerable money and lengthened the life of equipment. At some crossings the company has replaced worn and broken manganese hard centers with special forged tool steel plates, arc welding the plates in place. At another location where a long section of the rail had been broken out, and where the expense of removing the pavement to replace the rail would make its replacement costly, it was found that with the aid of the arc it was able to graft a new section of rail in place without disturbing the pavement to any great extent, consequently adding another achievement to its credit.

High-Speed Tool Steel

MODERN high-speed tool steel is a high alloy, the essential contents of which are within the following limits: Carbon, 0.5 - 1.0 per cent; tungsten, 12 - 20 per cent; chromium, 1.5 - 6.0 per cent, and vanadium, 0.5 - 2.0 per cent. Tool steel has several unusual characteristics peculiar to itself which are intimately connected with its treatment and utility. To obtain its best properties by hardening, it must be heated to an excessively high temperature such as would ruin simple steels. After this treatment tool steel will not lose its hardness on tempering until heated above a dull red heat. This valuable property explains its great superiority over carbon steels, which begin to lose hardness appreciably on tempering at 200 deg. C., while for high speed steel this loss does not occur until about 700 deg. C. is reached.

Construction of Dry Kilns

BASED on the experience of the United States Forest Products Laboratory the following notes have been prepared for the benefit of all users of wood. The notes regarding dry-kiln construction will be particularly suggestive to electric railway master mechanics.

Where insurance rates permit, a well-built wood kiln is very satisfactory, wood being a very good insulator, easily repaired and cheaper than the other materials. The chief objection to the use of wood, aside from fire risk, is its tendency to swell and shrink with alternate moist and dry conditions, causing more or less working of the frame and loosening of nails. All lumber should be thoroughly seasoned. Fir, Douglas fir, yellow pine, redwood, cypress and similar woods with low shrinkage rates should be used for sheathing and sills. For frame timbers any good straight-grained material is suitable. The sheathing should be shiplap laid horizontally and nailed twice at each stud, in the middle and at the bottom of the board. Outside walls should be sheathed on both sides or sheathed inside and plastered outside. They should also be insulated with a good moisture-proof, heat-resistant insulator. The ordinary quilt insulations sewed between so-called waterproof paper have not proved satisfactory in dry kiln construction. Walls should be painted on the inside with asphaltic paint. Where lumber is plentiful, crib or laminated construction may be used, the walls being built up of 2 by 6-in. planks laid flat, and the roof of similar material laid tight together. If the planks are well seasoned and well manufactured this form of construction permits very little heat loss, but if the lumber is low grade and knotty a tight, weather-resistant construction is extremely difficult to obtain. The shrinkage of the walls is excessive and causes considerable trouble at door jambs and where pipes pass through the walls.

Brick or hollow tile is procurable almost everywhere, and where permanency is desired is usually more satisfactory than wood. The brick or tile should be hard burned. The walls should be laid up in tempered or cement mortar. Unequal expansion in the exterior walls, caused by the difference in temperature of the outer and inner faces, is almost certain to create numerous small cracks, which should be painted up with an elastic cement rather than mortar. A kind of tile should be chosen that has openings running horizontally rather than vertically in the wall. The tile should be scored for plastering. Both sides of tile walls should be plastered with cement mortar. When brick, tile or concrete kilns are more than 50 ft. long it is advisable to build both the exterior and interior walls 12 in. thick, particularly if fireproof roofs are used.

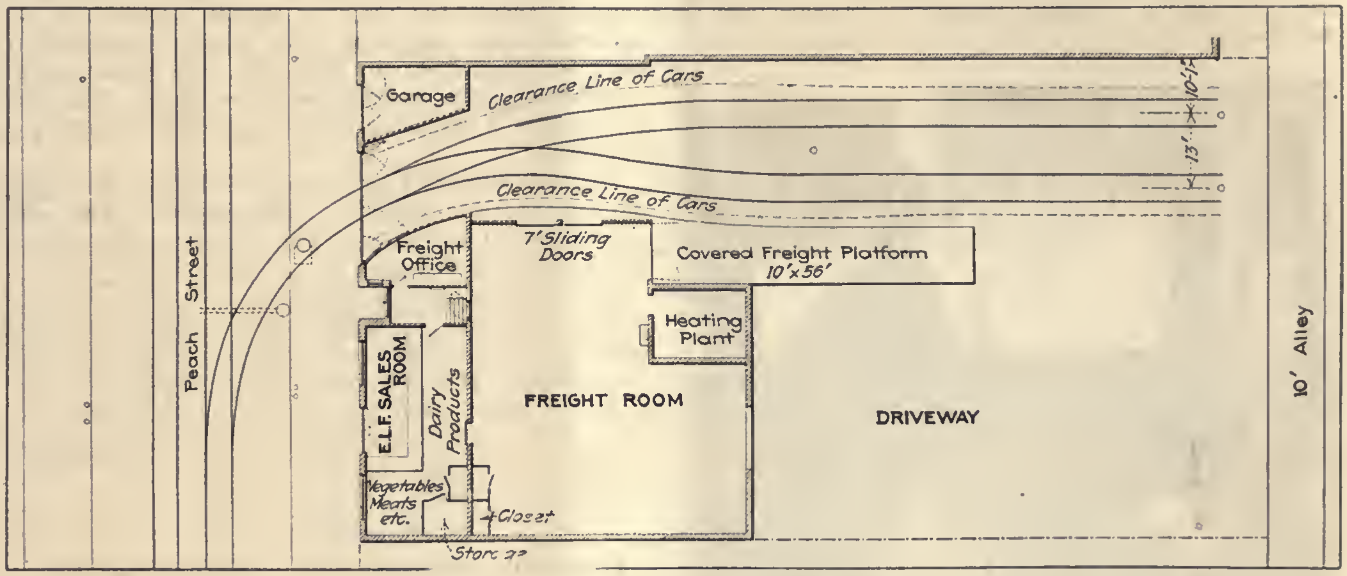
Walls of monolithic concrete or of concrete blocks are highly absorbent of moisture unless thoroughly water-proofed. It is very difficult to hold a high humidity within a kiln whose walls absorb moisture readily. The heat loss through such walls is also very great.

In comparing the above types of kilns the choice will depend upon the relative importance of the first cost, maintenance and fire hazard.

Interurban Freight Terminal Opened

Modern Facilities Result in Improved Service and More Efficient Handling and Delivery of Freight in New Terminal of the Northwestern Pennsylvania Railway in Erie

FOR several years prior to 1916 the interurban freight business of the Northwestern Pennsylvania Railway and of the Cleveland & Erie Railway in Erie, Pa., had been conducted in cramped quarters in a small storeroom on Peach Street. Both inbound and outbound freight was handled in this outgrown and obsolete terminal building. Freight cars were stopped on a passing siding near the center of the street and all freight was hand-trucked across the sidewalk between the car and the building. This arrangement was a nuisance to both pedestrians and drivers of vehicles and the cost was all out of proportion to the work done. The volume of business demanded facilities for handling freight more economically and plans were adopted with that end in view. A formal request was made of the City Council for a permit to install and operate a switch from the main track in the street across the sidewalk into the proposed freight terminal and a lease of adjoining property necessary for the execution of the plans was obtained. The plan provided for a double-track layout of five cars capacity and a freight house of ample floor space with all freight handled through entrance and exit in the rear, where wide driveways afforded opportunity to load and unload at the rear freight house door, or along a covered platform, or directly from the car, as circumstances might make most convenient. However, this plan was not carried out at that time due to the refusal of the City Council to issue the necessary permit because of protests from adjacent property owners affected. After much controversy and through the aid of many business organizations that found themselves deprived of necessary service, the Council finally passed the ordinance, which in due time was approved by the Public Service Commission, and on Oct. 21, 1920, the new freight terminal of the Northwestern Pennsylvania Railway was placed in operation.



PLAN OF FREIGHT STATION IN ERIE, PA.

This new freight terminal is a building on Peach Street, approximately 69 ft. x 56 ft., with a covered platform 10 ft. x 56 ft. extending from one corner parallel to the track extension which serves the terminal. In the opposite corner from the covered platform and facing the spur track is the freight office, while behind it and extending along the street is a room in which vegetables, meats, dairy products, etc., are handled. Cars can be loaded and unloaded through a door directly from the freight room or freight can be trucked onto the platform and then into the cars. In back is a spacious driveway for the receiving and distribution of freight from the covered platform.

Working Capital in Valuations

IN A supplement to the November issue of its publication, the *Annals*, the American Academy of Political and Social Science, Philadelphia, Pa., prints a paper by Dr. Delos F. Wilcox entitled "Working Capital in Street Railway Valuation."

Dr. Wilcox in this paper cites numerous cases of valuations of electric railway properties in which the subject of working capital has been considered and argued upon and in each case points out the fallacy of the arguments brought forward to sustain a working capital fund as a part of capital value when the working capital is figured or based upon the record of the company showing cash on hand from time to time. What Dr. Wilcox supports as the correct position with respect to working capital in street railway valuation is that the entire amount of money required in advance for the purchase of materials and supplies and for other prepayment is much more than offset under normal operating conditions by the accumulation of cash from the daily revenue collections in anticipation of the payment of deferred expenses, and that therefore a street railway company with a fully developed business and receiving from its patrons a revenue sufficient to cover the full cost of service is not entitled to any allowance whatever for permanent working capital as a part of the capital value to be taken as the basis for rate fixing.

Among the cases cited for analysis with reference to working capital are the valuation of the Pittsburgh Railways, the Cleveland Railway service-at-cost contract and operating record, the reserve fund in the

Boston service-at-cost act, working capital in the Bay State case, the Cincinnati reserve fund, various decisions of the Wisconsin, Illinois, Utah, District of Columbia and other commissions, and finally a detailed analysis of the Public Service Railway (New Jersey) valuation.

Swiss Railway Electrification Plans

AFTER the St. Gotthard line in Switzerland has been electrified, the State Railways will direct attention to the Vallorbe-Lausanne-Brigue line, assuring connection with France (via Dijon and Pontarlier) and Italy (via Brigue, the Simplon and Milan). *Le Génie Civil*, Dec. 18, states that the first step will consist of the introduction of single phase between Brigue and Lausanne, partly by changing over the present three phase between Brigue and Sion, and by electrifying the Sion-Lausanne section (57 miles). Power will be furnished by the Barberine hydro-electric station, located near Martigny, which will be completed in 1923.

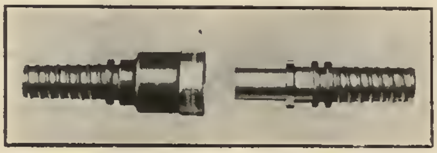
Light Portable Suction Cleaner

A HANDY portable suction cleaner for removing dust from places hard to clean has been placed on the market by the Air-Way Electric Appliance Corporation, Toledo, Ohio, under the name of "Air-Way Junior." It has a handle for convenient lifting by the left hand, a flexible cleaning hose, which is held in the right hand; a rubber cleaning attachment and brush holder, a brush, a fiber extension for cleaning corners, and an attachment for connecting the hose to the blower. While this was designed particularly for cleaning the interiors of automobiles and automobile establishments, the device can also be used for cleaning the interiors of electric cars.

OPERATING THE PORTABLE SUCTION CLEANER

New Type Hose Couplings

A HOSE coupling with several new features has recently been placed on the market by the Ingersoll-Rand Company, New York, N. Y. It is called the "Little David" Hose Coupling and will be distributed as an accessory to the line of "Little David" Pneumatic Tools manufactured by this company. Hose couplings which become leaky after short use are the cause of serious air losses, and another trouble commonly experienced with many couplings is jamming or sticking through some slight injury, making them difficult or almost impossible to connect or disconnect. The design of the "Little David" coupling has been with the view to overcoming these troubles. Its main features are sturdiness, simplicity and an all-around ability to stand all sorts of abuse.



NEW TYPE HOSE COUPLING

The coupling consists of two parts, male and female. The female end is fitted with a V-shaped rubber gasket providing an airtight joint. The gasket is prevented from blowing out by a protective shoulder inside the coupling should the coupling become accidentally disconnected under pressure. The locking shoulders are heavy with large bearing surfaces. The locking spring is strong and can be replaced if necessary. The parts are made of a metal not subject to ordinary rusting or corrosion.

The male end has a very liberal bearing in the female end and another feature is the absence of any outer sleeve exposed to injury. The air ports are straight and of uniform diameter.

The coupling may be connected or disconnected by a quarter turn. A groove in the hose end of each part allows using a hose clamp to attach securely to the hose. "Little David" Hose Couplings are manufactured in ½ in. and ¾ in. sizes, which are interchangeable; that is, a ½ in. male piece may be used with a ¾ in. female end or vice versa. Gaskets are also interchangeable between the different sizes.

Recorder for Both CO_2 and Combustible Present in Flue Gas

RECENTLY an instrument has been perfected and placed on the market by the Mono Corporation of America which not only analyzes and records the percentages of CO_2 present at all times in flue gases but also detects and clearly records on the same chart the presence and approximate proportion of combustible gases whenever they appear. It is claimed that a continuous indication of the percentage of CO_2 alone does not always give a true basis for determining combustion conditions, but that a continuous and simultaneous record of combustible gases present is also necessary. One of the prime purposes of this instrument, the Duplex Mono, is to detect the presence of combustible gases in the flue immediately upon their appearance and to record accurately the percentage of CO_2 present at that particular time. Very slight proportions of combustible gases are clearly recorded on the chart, giving warning of improper conditions and inefficient boiler operation.

Porcelain Tokens Used in Germany

ALL kinds of small emergency coins are now used in Germany. These are made out of sheet aluminum, zinc, iron or brass, but the most modern coin is made out of royal saxonian porcelain. Even this hard cash is rare and is substituted for by emergency paper money printed with more or less artistic taste by the large and small cities. This paper money is good only in its native city, so conductors must be extremely careful in accepting small paper money, and in order to facilitate payment of fares the Statt Cottbus Street Railway has isued some brass money of about $\frac{5}{8}$ in. diameter and with a $\frac{3}{16}$ in. center hole. This token can be purchased at the trunkline deposits, from a number of stores in the city and from the conductor. This token is good for one ride and saves trouble and time on the part of the motorman.

Comparison of Five Types of Glue

THE United States Forest Products Laboratory has furnished the accompanying table containing information regarding glue, which will be of interest to the master mechanics of electric railways.

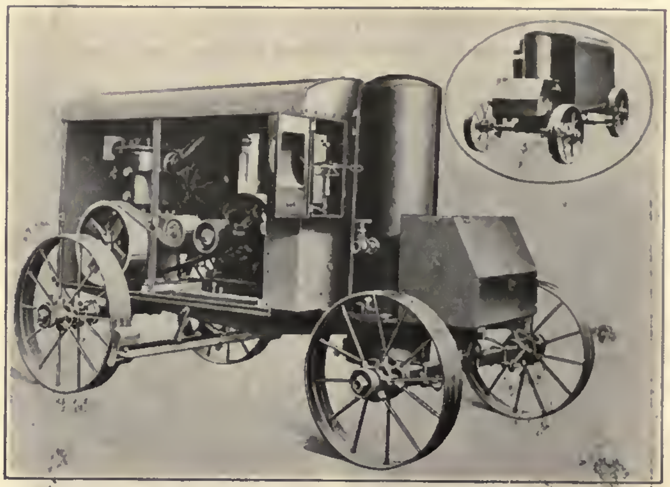
Particular Compared	Animal Glue	Casein Glue	Vegetable Glue	Blood Glue	Liquid Glue
Source	Hides, bones horns, etc.	Casein from milk	Cassava starch	Dried blood	Animal glue or fish parts
Cost per Lb. 1920	25–42 cent	16–20 cents	10–12 cents	20 cents	$1–$5 per gal.
Spread in Sq.Ft. per Lb.	25–35	35–55	35–50	30–100	No data
How Mixed	Soaked in water and melted	Mixed cold with rapid stirring	Mixed with alkali and cold or hot water	Mixed cold	No preparation
How Applied	Warm with brush or mechanical spreader	Cold with brush or mechanical spreader	Cold with mechanical spreader, not by hand	Cold with brush or mechanical spreader	Cold or warm usually applied by hand
Temperature of press	Cold, or with hot cauls	Cold	Cold	Hot	Cold
Strength (in shear test)	High grades stronger than strongest woods	Equal to medium grade animal glue	Equal to medium grade animal glue	High strength in plywood. Not used for joint work	Best grades equal to medium grade animal glue
Water resistance	Low	High	Low	High	Low
Chief uses in woodworking	For strong joint work	For water resistance plywood or joint work	For veneer work because of cheapness	For water resistant veneers	For repair work and small articles

Characteristics of Hardened Copper

TO CLEAR up much of the misunderstanding about hardening copper, the Bureau of Standards has issued a circular letter explaining the characteristics of and the methods for the hardening of copper. There are two well-known methods of hardening copper: One is mechanically to work it by hammering, cold rolling, drawing, etc., and the other is to alloy it with a small amount of another metal, usually zinc, tin, aluminum or iron. The alloyed metal is no longer copper, but should be referred to according to the chief alloying constituent. The misconception about the loss of the so-called art of tempering bronze is made clear by the statement that any hardness of the cutting edges on knives or swords made of copper and bronze was obtained by hammering and not by any method of tempering. Any bronze today can be made as hard if not harder than that of prehistoric times by hammering alone.

New Portable Compressor Outfit

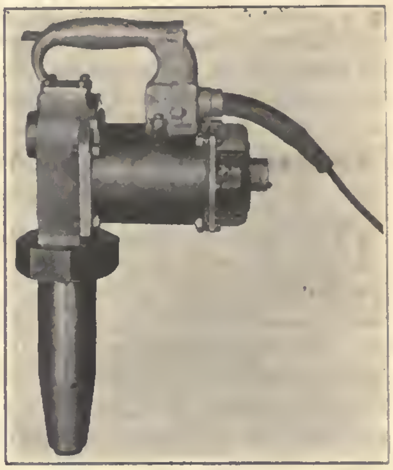
THE Ingersoll-Rand Company has recently added an electric motor-driven portable compressor outfit to its line of "Imperial" compressors. This unit is of 118 cu.ft. capacity and weighs approximately 4,450 lb. It is of all-steel construction, and steel doors at the sides provide easy access to the operating equipment and afford protection from the weather. A suitable intake unloader is provided for regulation. Either alternating or direct current motors can be supplied as desired.



PORTABLE ELECTRIC DRIVEN COMPRESSOR OUTFIT

Electric Hammer Drill

A NEW type of drill, called the Little Giant Electric Hammer Drill, is now being manufactured by the Chicago Pneumatic Tool Company. It is most suitable for drilling concrete and soft stone and for light chipping of metals. A motor designed for either direct or alternating current runs the drill. The hammer blow which is delivered by a piston on the drill steel or chisel is produced by a pneumatic impact. At the instant the blow is struck the piston is running free of all mechanical parts, and therefore no shock or vibration is transmitted to the electrical parts of the tool. This means that there is no tendency for the electrical wire or connections to become crystallized due to incessant jarring. The switch is conveniently located in the handle for control of the electric circuit. All bearings are of the ball type, provision



ELECTRIC HAMMER DRILL FOR LIGHT DRILLING AND CHIPPING being made for the lubrication of all revolving and reciprocating parts. The gear and those portions of the moving parts subject to wear are all hardened. A special feature of this drill is the live air device for clearing the hole of the cuttings.

Moving Trolley Pole with Concrete Setting

IN THE issue of the ELECTRIC RAILWAY JOURNAL for Sept. 25, 1920, page 584, mention was made of the use of the "International" truck crane, made by the International Crane Company, in moving trolley poles and in other heavy lifting and carrying work. A job stated to have been witnessed by the writer of the article was one in which a steel trolley pole was lifted with a mass of concrete around its butt and dropped into a hole some yards distant, the whole operation requiring but a few minutes after the machine reached the work. The load lifted in this case weighed about 1 ton, and only a foreman and two other men were required on the ground with the derrick man and the chauffeur on the truck. The accompanying photographs of this job have been taken to give a more concrete idea of the operation. The International crane consists of a rotatable derrick, mounted on a 7½-ton Mack truck. The derrick has a lifting capacity of 6,000 lb. at 12 ft. radius, with corresponding capacities of other radii. The derrick is operated by a Stearns engine.

UTILIZING A TRUCK CRANE FOR MOVING A TROLLEY POLE IN CLEVELAND

Fundamentals of Cold-Weather Concrete Practice

THE methods used by contractors for continuing concrete work in spite of low temperatures by applying proper protective measures is discussed in the current issue of *Concrete in Architecture and Engineering*. An ever-increasing amount of concrete work is being done without interruption twelve months in the year, instead of seven or eight as formerly. Thus steady employment can be offered to employees and overhead costs can be reduced. The fundamentals of cold-weather concrete practice are storing the aggregates in advance under shelter to prevent their freezing into a solid mass, heating materials enough to give required warmth to the mixture, speedily transferring the mixture to the forms, and protecting the concrete from loss of heat while hardening by a temporary canvas shelter and by fires.

Steam Railroad Statistics

THE statistical report of the railways under the jurisdiction of the Interstate Commerce Commission for the year ended Dec. 31, 1918, has just been published. It shows a total of 1,849 roads, with 253,528 miles of line owned and 264,233 miles of road operated. There are 8.53 miles of track for each 100 square miles of territory and 24.02 miles of track for each 10,000 inhabitants. At the close of 1918 seventy-four roads with 16,805 miles owned were in the hands of receivers.

All of the companies in the country had 67,563 steam and 373 electric locomotives, 2,427,460 freight cars, 56,611 passenger cars and 105,192 service cars. The employees numbered 1,837,663. The capital outstanding, not including securities of inactive or of switching and terminal companies and excluding also securities held by other railway corporations, amounted to $16,454,339,035, of which the stock represented $6,732,728,684 and the unmatured funded debt $9,722,060,351.

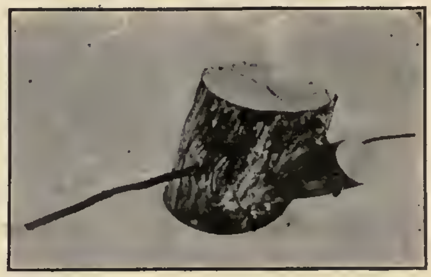
Gasoline-Propelled Trains in India

THE whole service of the Nasik tramways in India is furnished with four gasoline-driven cars, each equipped with a 45-hp. four-cylinder motor. The change-speed gear box is arranged so that it is foolproof even to the most unskilled driver. There are two speeds in both directions and two operating levers, one for speed changing and the other for reversing. The planetary system of gear changing does not involve the disengaging of any of the toothed wheels, which are always in mesh, as it is effected by engaging a clutch plate with either of the two driven members. Reversal is effected by engaging one of two bevel gears, driven by one pinion, with a dog clutch on the shaft.

Tree Grows Around Wire

THE accompanying illustration shows a 110-volt distribution wire passing through the center of a limb of a tree. The wire was not deliberately placed in that position, but is the result of the wire rubbing against the limb and of the limb eventually growing around the wire. The limb appears to have a growth of approximately nine years.

This unusual condition was found by the trouble gang of the British Columbia Electric Railway, Ltd., Vancouver, B.C., when inspecting the distribution lines recently. A property owner had pruned the trees on the boulevard in front of his house on Nichola Street and finding the above condition to exist had simply cut the limb above and below the wire and left that portion of the limb shown in the illustration suspended in the air. When the trouble gang found it, it cut the wire on each side of the limb and turned the specimen in to the office to confirm the necessity of its application for an appropriation to cover the cost of pruning trees that were damaging or interfering with the company's distribution system.



UNUSUAL CONDITION FOUND ON DISTRIBUTION SYSTEM

American Association News

AS DATE OF MID-YEAR CONFERENCE DRAWS NIGH, ELECTRIC RAILWAY INTEREST IS FOCUSED ON FINANCE, THE TOPIC SELECTED FOR SPECIAL TREATMENT —PRESIDENT GADSDEN ALSO URGES SPECIAL ACTION REGARDING F. E. R. C. REPORT

Mid-Year Conference and Dinner

at Chicago, Ill., Feb. 10, 1921

SUBJECT:

Electric Railway Financing

Papers at the Mid-Year Conference

THE committee on subjects, of which J. D. Mortimer is chairman, has made public the following details of the subject matter to be treated in the papers at the Chicago convention:

"Previous Methods of Electric Railway Finance," by James F. Fogarty, secretary the North American Company, New York. This paper will give a summary of the changing methods of financing capital improvements from the days of early electrification down to the present, with reasons therefor; influence of low rates of return on such methods, as disclosed by the large proportion of capital securities represented by interest-bearing debt; influence of the holding company and probable future; war-time financing; post-war financial methods.

"Present Requirements for Mortgage Securities," by F. K. Shrader, Halsey, Stuart & Company, Chicago. In this paper Mr. Shrader will give an analysis of what competition requires in the way of relation of cash invested to amount of loan; influence of previous history on electric railway investments; margin of earnings over interest charges; flexibility of mortgage provisions; necessity of ample stable earnings as a condition precedent to re-establishment of credit to be derived from automatic regulation or cost-of-service franchises; characteristics of interest bearing securities which the general market is likely to absorb during the next year or two.

"Home Town Financing—Partial Mutual Ownership," by S. B. Way, vice-president and general manager the Milwaukee Electric Railway & Light Company. This paper will describe the desirability of large local interest being held by car riders; influence on local regulatory ordinances, etc.; cost of capital procurable by this means; methods of distribution.

"Necessity of Financing by Sale of Capital Shares," by Chester Corey, vice-president Harris Trust & Savings Bank, Chicago. Mr. Corey in this paper will point out the importance of providing for return on new capital that will invite the investment of new money through the purchase of issues of capital stock; requirements in the way of franchises or methods of regulation which will support such plans of financing.

"Municipal Aid in Electric Railway Financing," by Melvin A. Traylor, president First Trust & Savings Bank, Chicago. This paper will give the conditions under which municipal co-operation is required; moral support and abandonment of the street railway as a political issue; pledge of municipal credit through guarantees; municipal aid for rapid transit in construction of subways and elevated lines.

Ladies to Dine and Dance

ARRANGEMENTS have been made with the Hotel Drake for serving a special table d'hôte dinner to the feminine guests at the mid-year conference in Chicago, Feb. 10. This will be served in one of the private dining-rooms on the mezzanine floor adjoining the main dining-room in which the banquet of the railway men will be held. It has a little balcony and doorway opening out over the main dining-room so that the banquet music will also entertain the ladies.

After dinner the ladies will proceed to the Aisle of Palms, which extends along the main dining room about 3 ft. above it, and is separated from it only by a low balustrade. From this position they will be able to hear and see the speakers and entertainers to good advantage.

After the banquet and addresses have been completed, there will be dancing in the Aisle of Palms, with music furnished by another orchestra. The sub-committee on ladies' entertainment, of which John Benham is chairman, has thought it unwise to make any definite arrangements to entertain the ladies during the one-day convention. The Drake is so readily accessible to the great shopping center of Chicago by taxicab and by the buses of the Chicago Motor Bus Company, which pass the door frequently, that the committee thought the ladies would more than likely prefer to entertain themselves in the shopping district during the day.

However, these same buses run north along Lake Shore Drive for a distance of eight miles and pass the Edgewater Beach Hotel, which is one of Chicago's unique attractions. If the weather favors, it may be that some special arrangements will later be made for a drive up the lake shore through Lincoln Park and to the Edgewater Beach Hotel.

New York Delegation Going to Chicago Meeting via Broadway Limited

THE mid-year conference committee on transportation for New York and vicinity, of which Carl H. Beck, Westinghouse Electric & Manufacturing Company, is head, has completed transportation arrangements for those who plan to attend the Chicago meeting. The party will leave New York at 2:45 p.m., Feb. 8, via the "Broadway Limited" of the Pennsylvania Railroad and arrive in Chicago on the following morning. Special cars will be attached to this train unless the delegation is sufficiently large to warrant the operation of a special train.

The following letter, which is being sent by the committee to all members of the Association, gives full details:

> The mid-year meeting and dinner of the American Electric Railway Association, to be held in Chicago, Feb. 10, is to be one of the most important meetings in the history of the Association.
>
> Circumstances brought about through the rapidly changing conditions incident to post-war readjustments are such that railway men and manufacturers should give more than ordinary attention and support to this occasion. Now is the time to put an optimistic punch into the affairs of the industry. The subjects to be covered at the meeting, as well as the speakers and subjects at the dinner, are being announced through other channels, from which it can be observed a most complete program is arranged.
>
> Your committee on transportation, charged with the duty of securing transportation accommodations from New York and vicinity, has selected the Broadway Limited, via the Pennsylvania Railroad, on Tuesday, Feb. 8, as the train and date accommodating the greatest number desiring to make this trip to Chicago. This train leaves New York at 2:45 p.m., arriving at Chicago at 9:40 o'clock the following morning, and it is now hoped to join with delegates from Philadelphia, Baltimore, Washington, Harrisburg, etc., in making this trip.
>
> Accommodations can be secured by application to E. B. Burritt, secretary American Electric Railway Association,

8 West Fortieth Street, New York City, accompanied by New York check to his order, or similar funds, in accordance with the following schedule:

Lower berth, including all transportation charges, one way, $55.37.

Upper berth, including all transportation charges, $53.43.

Compartment, two tickets required, including all transportation charges, $118.84.

Drawing room, minimum two tickets required, including all transportation charges, $125.32.

Extra for third person in drawing room, $45.65.

Reservations for the return trip can be secured by expressing a desire for them at this time. A representative of the railroad company will be on hand at Chicago to take care of the details, but it is recommended that advance reservation be made to insure adequate accommodations for all those desiring to return from Chicago.

An endeavor is being made to arrange through the Central Passenger Association for reduced fare for the return trip. The results of this endeavor will be announced shortly.

Replies to this communication making reservations, must be in the hands of the committee by Saturday, Jan. 22, in order that suitable Pullman accommodations may be secured.

Be on hand. Bring all the enthusiasm you can collect; if you haven't any, somebody else will have it. Travel with the bunch.

Very truly yours,
C. H. BECK, C. B. KEYES,
ROSS HAYES, THOS. L. LANGAN,
C. R. ELLICOTT, Chairman,
Sub-Committee on Transportation, New York and Vicinity.

Executive Committee Holds Busy Meeting

A MEETING of the executive committee of the American Association was held at New York headquarters on Friday, Jan. 7, with most of the members of the committee in attendance. The committee had an extensive program before it for consideration and accomplished a great deal of work.

Approval was given to the amendment to enlarge the executive committee from fourteen to twenty, as proposed by President Pardee at the Atlantic City convention. It will thus be voted on at the mid-year conference in Chicago on Feb. 10.

The committee approved the support of an appropriation by Congress of $50,000 for the Bureau of Standards to pursue electrolysis investigation. It was brought out that the bureau and the association are working in close co-operation on this subject.

Secretary Burritt presented the financial statement for the year ended Oct. 31, 1920, together with a statement of expenses of the 1920 convention, and also his budget for the fiscal year ending Oct. 31, 1921, all of which were approved by the committee and ordered published in the Transactions.

Fifteen companies were ordered reinstated on payment of last year's dues, making the total now 344 railway companies, 246 manufacturing companies, 890 individual members, and 1,250 company section members.

Charles L. Henry was given a vote of appreciation as chairman of the national relations committee for the work that he and his committee have done in connection with the Railroad Labor Board decision on interurbans recently rendered at Chicago.

Reports of several committees were received and also the report of the Bureau of Information and Service outlining its activities for the last three months and listing the bulletins issued.

President Gadsden announced the personnel of the committee to bring in a report to the mid-year conference on the Federal Electric Railways Commission report and the report of the Special Commission on Public Utilities of the United States Chamber of Commerce, as follows: Walter A. Draper, Henry G. Bradlee, Thomas S. Wheelwright, Arthur W. Brady, John J. Stanley, Lucius S. Storrs, James P. Barnes, J. H. Hanna, J. D. Mortimer, J. K. Newman and Britton I. Budd.

He also appointed the following as the locations committee for the next convention: John G. Barry, chairman; Charles L. Henry, H. D. Shute, B. A. Hegeman, J. J. Stanley, J. N. Shannahan, W. H. Sawyer, D. B. Dean, and the following members of last year's exhibits committee: F. H. Gale, H. Fort Flowers, F. J. Dell and J. B. Kilburn.

The committee adjourned to meet at the Drake Hotel in Chicago on Feb. 9, the day preceding the mid-year conference.

Consideration of Federal Report Urgent

PRESIDENT P. H. GADSDEN looks upon action by the association on the report of the Federal Electric Railways Commission and the report of the special committee of the Chamber of Commerce of the United States as one of the most important matters scheduled for consideration at the Chicago conference. Nothing that the Association can do, in his opinion, will be more helpful than to place itself squarely upon record before the public in this matter. This statement is contained in a letter sent by him under date of Jan. 12 to the executives of member companies and accords with opinions expressed by him in the interview with him which appeared on page 6 of the issue of this paper for Jan. 1, 1921.

The letter of Mr. Gadsden to the executives of member companies follows:

AMERICAN ELECTRIC RAILWAY ASSOCIATION

Jan. 12, 1921.

To Executives of Member Companies:

DEAR SIR: I want to urge you personally, as strongly as I can, to have your company represented at the Mid-Year Conference of the Association at Chicago, February 10, when a special committee will present a report on the recommendations made in the report of the Federal Electric Railways Commission and the report of the special committee of the Chamber of Commerce of the United States.

No other utility has had the advantage of two such thorough investigations by impartial bodies, and the reports undoubtedly represent the opinion of the American public.

Up to this time, however, there has been no official expression of the Association's attitude with respect to the conclusions and recommendations contained in the reports, and it is believed that nothing the Association could do would be more helpful than to place itself squarely upon record before the public.

The special committee will present its report at the conference for discussion and appropriate action, which will make known to the public the attitude of the electric railway industry.

It is believed that nothing more striking or more helpful toward bringing about a better understanding on the part of the public could be done by the Association at this time.

For this reason every company member should be represented when the report is discussed and a resolution setting forth the Association's attitude voted upon.

This is so important that I want to urge you personally to be present at the conference and have as many of the officers of your company in attendance as possible.

While the general subject of electric railway financing, to be discussed at the conference, is of interest mainly to executives, it undoubtedly will prove of such a highly educational nature as to be extremely beneficial to subordinate officials as well.

I would appreciate word from you that you will make a special effort to attend the conference and participate in the discussions and whatever action the Association may take.

Very truly yours,
P. H. GADSDEN,
President.

Personnel of Engineering Association Committees

IN THE issue of this paper for Dec. 25, page 1296, the full list of assignments to Engineering Association committees was given, together with the names of the chairmen of the several committees. At that date the personnel of the committees was not complete. It is now possible to give this as follows:

Committee on Apprenticeship Systems — F. R. Phillips, Pittsburgh (Pa.) Railways, chairman; L. C. Datz, American Cities Company, Birmingham, Ala.; H. A. Johnson, Metropolitan West Side Elevated Railway, Chicago, Ill.

Committee on Buildings and Structures — D. E. Crouse, Rochester & Syracuse Railroad, Syracuse, N. Y., chairman; E. H. Berry, Cincinnati (Ohio) Traction Company; B. R. Brown, Dallas (Tex.) Railway; N. E. Drexler, Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va.; H. V. Haulard, New Orleans Railway & Light Company, New Orleans, La.; B. P. Legare, United Railroads of San Francisco, Cal.; James Link, Knoxville Railway & Light Company, Knoxville, Tenn.; J. R. McKay, Indiana Service Corporation, Fort Wayne, Ind.; S. J. Steiner, Aurora, Elgin & Chicago Railroad, Aurora, Ill.

Committee on Equipment—Daniel Durie, West Penn Railways, Connellsville, Pa., chairman; W. S. Adams, J. G. Brill Company, Philadelphia, Pa.; H. A. Benedict, Public Service Railway, Newark, N. J.; J. C. C. Holding, Midvale Steel & Ordnance Company, Philadelphia, Pa.; H. A. Johnson, Metropolitan West Side Elevated Railway, Chicago, Ill.; T. R. Langan, Westinghouse Electric & Manufacturing Company, New York City; F. H. Miller, Louisville (Ky.) Railway; C. N. Pittenger, Steubenville, East Liverpool & Beaver Valley Traction Company, East Liverpool, Ohio; E. D. Priest, General Electric Company, Schenectady, N. Y.; C. F. W. Rys, Carnegie Steel Company, Pittsburgh, Pa.; F. W. Sargent, American Brake Shoe & Foundry Company, New York City; Charles F. Scott, General Electric Company, New York, N. Y.; Karl A. Simmon, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.; C. W. Squier, ELECTRIC RAILWAY JOURNAL, New York City; J. M. Yount, United Railroads of San Francisco (Cal.); R. H. Dalgleish, Capital Traction Company, Washington, D. C.

Committee on Power Distribution—Charles R. Harte, The Connecticut Company, New Haven, Conn., chairman; Azel Ames, Kerite Insulated Wire & Cable Company, New York City; C. C. Beck, Ohio Brass Company, Mansfield, Ohio; Ralph W. Eaton, Public Service Engineer, Providence, R. I.; H. H. Febrey, American Steel & Wire Company, New York, N. Y.; C. J. Hixson, General Electric Company, Schenectady, N. Y.; Charles H. Jones, Metropolitan West Side Elevated Railway, Chicago, Ill.; F. McVittie, New York State Railways, Rochester, N. Y.; M. B. Rosevear, Public Service Railway, Newark, N. J.; W. Schaake, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.; A. Schlesinger, Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.; F. J. White, The Okonite Company, Passaic, N. J.

Committee on Power Generation—A. B. Stitzer, Republic Engineers, Inc., New York, N. Y., chairman; L. D. Bale, Cleveland (Ohio) Railway; H. P. Bell, San Francisco-Oakland Terminal Railways, Oakland, Cal.; Walter E. Bryan, United Railways of St. Louis (Mo.); N. A. Carle, Public Service Electric Company, Newark, N. J.; F. C. Chambers, Des Moines (Iowa) City Railway; H. E. Davis, New York State Railways, Utica, N. Y.; C. A. Greenidge, J. G. White Management Corporation, New York, N. Y.; H. A. Kidder, Interborough Rapid Transit Company, New York, N. Y.; Charles F. Lloyd, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.; G. W. Saathoff, Henry L. Doherty & Company, New York, N. Y.; E. H. Scofield, Minneapolis (Minn.) Street Railway; L. R. Shattuck, Sanderson & Porter, New York, N. Y.; E. P. Waller, General Electric Company, Schenectady, N. Y.

Committee on Way Matters—R. C. Cram, Brooklyn Rapid Transit Company, Brooklyn, N. Y., chairman; H. A. Abell, New York State Railways, Rochester, N. Y.; Charles A. Alden, Bethlehem Steel Company, Steelton, Pa.; Victor Angerer, William Wharton, Jr., & Company, Easton, Pa.; S. Clay Baker, East St. Louis & Suburban Railway, East St. Louis, Ill.; W. R. Dunham, Jr., The Connecticut Company, New Haven, Conn.; E. B. Entwisle, The Lorain Steel Company, Johnstown, Pa.; H. Fort Flowers, Differential Car Company, New York, N. Y.; Howard H. George, Public Service Railway, Newark, N. J.; W. F. Graves, Montreal (Que.) Tramways; E. M. T. Ryder, Third Avenue Railway, New York, N. Y.; T. B. Skelton, Metal & Thermit Corporation, New York, N. Y.

Equipment Committee Gets to Work

THE equipment committee of the Engineering Association held its first meeting of the year at association headquarters in New York City on Jan. 12. Those present were Daniel Durie, West Penn Railways, chairman; W. S. Adams, J. G. Brill Company; T. R. Langan, Westinghouse Electric & Manufacturing Company; F. H. Miller, Louisville Railway; C. N. Pittenger, Steubenville, East Liverpool & Beaver Valley Traction Company; C. F. W. Rys, Carnegie Steel Company; F. W. Sargent, American Brake Shoe & Foundry Company; C. F. Scott, General Electric Company; K. A. Simmon, Westinghouse Electric & Manufacturing Company, and C. W. Squier, ELECTRIC RAILWAY JOURNAL.

The twelve subjects given to this year's committee for consideration and report, printed in the issue of this paper for Dec. 25, 1920, were taken up and discussed. In order to minimize the number of sub-committees necessary for carrying on this work, several subjects were combined and assigned to one committee. In the list as previously given, subjects 2, 3, and 11; 4 and 10, and 7 and 8, respectively, were combined, thus reducing the number of sub-committees to eight. The work to be taken up is divided as follows, the name given first in each instance being that of the chairman of the sub-committee: (1) Brake shoes, heads and keys—Messrs. Sargent, Benedict, Holding and Pittenger; (2, 3 and 11) Tread and flange contour of wheels—Messrs. Dalgleish, Benedict, Durie, Holding, Rys and Sargent; (4 and 10) Specifications and standards—Messrs. Johnson, Dalgleish, Holding and Rys; (5) Helical gears—Messrs. Durie, Priest, Johnson and Simmon; (6) Car arrangement and design—Messrs. Benedict, Adams, Langan and Scott; (7 and 8) Life of wearing parts—Messrs. Pittenger, Langan, Priest, Scott, Simmon, Squier and Yount; (9) Direct-current lightning arresters—Messrs. Miller, Langan, Pittenger and Scott; (12) Layout of shop building—Messrs. Squier, Adams, Johnson, Miller, Priest, Simmon and Yount.

In connection with the study to be made of the life of wearing parts, the committee decided that this year's work should be confined to obtaining information on cast-iron and steel wheels, brake shoes, axle and armature bearings and trolley wheels. The next meeting of the committee will be held at association headquarters on March 16 and 17.

New Section at Camden

A COMPANY section of the American Association was formed at Camden, N. J., on Jan. 13, by employees of the Southern Division, Public Service Railway. Several representatives of the association from out of town were present and assisted in the launching of the new enterprise. While an active section has been maintained by Public Service for several years, it has been difficult for geographical reasons for the employees in the Southern Division to take an active part in the section activities. The inauguration of section work at this point is part of the program of Manager Martin Schreiber, outlined in his Atlantic City convention paper, for the development of a co-operative spirit in his organization.

Letters to the Editors

The Selling Idea in Zone Fares

MOUNT VERNON, N. Y., Jan. 10, 1921.

To the Editors:

Your publication of the article by L. S. Storrs on "Our National Fare Experiment" in the issue of Jan. 1 is a characteristic bit of enterprise in keeping a step or two ahead of the mass mind of the industry. The diagrams or maps must prove especially helpful in showing how far our pioneers have gone in these zone fare beginnings.

Somewhat loosely, I think, Mr. Storrs states that "It appears that there is no known method of assessing fares upon the riding public that has not been tried in this national experiment." Then he adds with delicious humor: "Some methods never heard of before have also been tried, as is evident."

However, it is far less important to list types of graduated and other special fares that have not been tried in the United States than it is to point out that the spirit in which such changes are made is far more important than the outer resemblance to fare schemes elsewhere. Our operators and regulators are still largely steeped in the unit-fare tradition which gave so little scope to the selling of transportation. In a real business, special inducements are always made to secure the patronage of those who can stay away, on the basis that overhead as well as operation enters into the cost of the article sold. In our industry—for it is not yet a business—those who can stay away are the walkers, the automobilists, the motor-truck riders and that more than half of the population not engaged in earning a living. When examined through this lens of traffic creation it is evident that few indeed of our roads have adjusted their fares in the true spirit of transportation salesmanship which underlies the graduated fare.

WALTER JACKSON.

Points of Difference Between American and German Railway Practices

BERLIN, GERMANY, Nov. 22, 1920.

To the Editors:

There are two main points in which American and German electric railway equipment practices seem to differ. To these I think attention might well be directed in the United States, with a view to possible saving in maintenance and operating costs.

The first is the use of bow collectors rather than trolley wheels. The former would be of particular value with one-man safety cars, as their use would eliminate traffic interruptions due to the trolley wheel leaving the wire.

The second point is the use of the electric brake in place of the air brake. The modern motor is rugged enough to be used as a generator without undue heating and it would appear to be useless to introduce compressed air as a further means of braking. Moreover, air-brake equipment is expensive in first-cost, in power consumption and in maintenance. The Berlin street railways are planning to abandon air-brake equipment entirely because investigation has shown that they would thus have saved in 1913 the equivalent of 1 per cent in dividends. If this is true with pre-war costs of labor and materials, the saving would be much more under present conditions.

The prevalent idea in this country is that the air brake was introduced ten or twelve years ago only because the electric motor was not sufficiently well developed, having no commutating poles and being less well insulated.

I realize, of course, that compressed air is well liked in America, not only for braking but also for the operation of other safety appliances. However, I think the electric brake merits at least reconsideration.

"ENGINEER."

More About Foreign Rail Sections

EDGAR ALLEN & COMPANY, LTD.

SHEFFIELD, ENGLAND, Dec. 31, 1920.

To the Editors:

I have read with interest the articles on rail sections in the Nov. 27 and Dec. 4 issues of the ELECTRIC RAILWAY JOURNAL. The decision of the French tramways to adopt a flat tread with cylindrical wheels is very important and one which would not have been reached without very careful consideration. At the instance of Monsieur Bacqueyrisse, engineer General Omnibus Company, Paris, numerous inquiries were sent out before the war to French and German tramway companies. It was upon the results of this investigation that the decision was arrived at.

At the meeting of the Tramways & Light Railways Association, in July, 1920, to which you evidently refer in your article, I brought up this question and there was a very interesting discussion. Several engineers favored the flat rail and cylindrical tread wheels, provided that the track was new, but they preferred continuing the existing track with a radius rail. The radius now in general use is 12 in.; the London County Council, however, prefers the 6-in. radius. The result is that many companies now have both types. The engineering standards committee is at present considering this question and also that of increasing the depth of the groove.

On the subject of compromise joints, the article by R. C. Cram in your issue of Nov. 27 is very interesting and the illustrations are excellent. The method of determining the "hand" shown in Fig. 18 is the same as that adopted here, and cast joints are chiefly used.

I note that the American Electric Railway Association has adopted the term "special trackwork," which is the same as the term used here except that in America you spell "trackwork" as one word, whereas here we separate it into two. I think that "trackwork" is an improvement over "track work."

FRED BLAND,
Tramway Department.

"Get that Guy's Number"

A RECENT striking poster issued by the Ontario Safety League, as electric railway bulletin No. 140, has the above caption. The story told in the bulletin is this: "The conductor was helping an old lady off a car. An automobile shot by. 'Get that guy's number,' shouted the conductor to the motorman. They got it and it was reported to the police department." "That is safety education," states the poster.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Carhouse Burned

Additional Facts About Fire that Destroyed De Baliviere Structure in St. Louis

For the second time in less than three years the De Baliviere carhouse of the United Railways, St. Louis, Mo., has been partly destroyed by fire. The conflagration, which started on the evening of Jan. 3, burned the southeast section of the sheds to the ground. Sixteen motor cars were destroyed and seven motor cars and four trailers were badly damaged. Ten other cars were scorched and had windows melted or broken. Many cars in use on the Oliver line were put out of service permanently or temporarily, but traffic officials of the company saw to it that schedules on the days following were not disarranged. In consequence the public has not been inconvenienced by the fire.

Former Mishaps

The first fire at the sheds occurred on June 14, 1918, the eastern portion of the building being destroyed. Twenty-eight cars and a snow sweeper were lost in that fire. Another fire affecting the railway was the one at the plant of the carbuilders in October, when fifty cars in the course of construction for the United Railways were burned.

The De Baliviere carhouse extends from De Baliviere Avenue west to Laurel Street. Waiting rooms, offices and a power house are grouped about the sheds, but none of these was harmed. On the south the sheds are flanked by a number of apartment houses and these were thought to be in danger for a while, as the wind blew in that direction. The flames were, however, confined to the section of the sheds where the fire had started.

An investigation has been started by company officials to determine the origin of the fire. Car 365, near the center of the building and almost entirely consumed, had been put in the sheds only about five minutes before the fire was discovered. One theory advanced is that someone had dropped a lighted cigar or cigarette in the car or down a window slot.

Repair work on the building has been started and will be rushed to completion. Some alterations will be made at the same time. Cars which were damaged in the fire are being repaired and will be back in service in a very short time. The accompanying illustrations were made from photographs taken by F. C. Krug, official photographer of the railway company.

RUINS OF THE DE BALIVIERE CARHOUSE

Fight Expected Over Abolition of Commission

A fight is expected in the State of Arkansas over the public utilities commission. The incoming administration, which will be headed by Governor-elect McRea, was elected on a platform one of the planks of which called for the abolition of four state commissions, including the Public Service Commission. Such action, however, cannot be taken except by legislation. The matter came to a head a few days ago when Governor Brough was called on to appoint a member of the commission to fill a vacancy. He asked Governor-elect McRea to assist him, but the latter declined on the ground that the people by their vote had indorsed the commission abolition plank.

Wage Cut Rejected

Proposed Revision of Trainmen's Pay Downward at Detroit Will Go to Arbitration

The proposed wage cut of approximately 20 per cent which was suggested by the Detroit (Mich.) United Railway for all employees, effective Jan. 1, has been again rejected by the trainmen by an almost unanimous vote. The ballot was taken to determine the attitude of the men on the question, as it was contended by the Detroit United Railway that the men had not been properly informed as to conditions and that the men who attended the first meeting at which the subject was considered did not constitute a majority of the employees. At the first meeting a resolution was passed unanimously refusing the cut. At meetings held during the week ended Jan. 8 the employees voted 1663 to 4 against accepting the proposed cut.

It is believed that as soon as the company is officially notified of the decision of the union, steps will be taken leading to the appointing of a board of arbitration.

Since employees of some of the Interurban lines involved have not yet voted on the question, it is not anticipated that formal notification will be sent to the Detroit United Railway officials until after further meetings of the men have been held.

At the meeting of the Detroit employees, W. B. Fitzgerald, vice-president of the Amalgamated Association, criticised the company for its proposal to reduce wages at the present time, and urged the men to reject the proposal.

People's Ownership Plan Declared Feasible

Chicago Mayor's Traction Commission Reports for Five-Cent Fares— Proposed Transportation District Law Drafted

Mayor Thompson's long heralded plan for a restoration of a 5-cent fare in Chicago under a municipal-owned traction system was submitted to the City Council on Jan. 7 in the form of a report of his Commission on Local Transportation. With this was submitted a report by the commission's engineer, George W. Jackson, in which it was stated that he believed the Mayor's plan for a 5-cent fare was feasible "without adding any permanent burdens to the taxpayers of Chicago." There was also the draft of a proposed enabling act, which is to be sent to the State Legislature for passage, giving the voters of Chicago the power to establish the transportation district.

IN the early part of its report the commission points out that it has accumulated a mass of information, including maps of possible routes of subways, plans for structures and construction, data showing population and travel on lines of local transportation, etc., but it has acted on the theory that the commissioners were charged with the duty of working out a practical method of local transportation for the people, rather than to accumulate "ponderous reports and documents that would be filed away and result in nothing tangible."

It is also noted that it is not the function of the commission to formulate fixed plans and methods of local transportation, as it would appear unwise to select any one or any combination of plans, because it is desired to leave it to the trustees of the proposed Transportation District, to determine what is best at that time in the way of a proper traction system. Farther along in the report appears the statement that "we have omitted from our report the non-essential mass of detail, to the end that our conclusions and recommendations might not be obscured in the public mind through over-emphasis of some unimportant details by the opponents of people's ownership."

1907 TRACTION ORDINANCES QUOTED

In answering the question as to whether people's ownership is feasible and desirable, the commission points briefly to the provision of the 1907 ordinances wherein the city is authorized to purchase the traction lines, and to the Mueller law which purported to authorize the city to issue certificates on which to raise money to pay for the lines. The Supreme Court, however, held that such certificates constitute indebtedness of the city issuing them and that if the city of Chicago issued such certificates it would exceed the limit of its bonded indebtedness, and that, therefore, the city could not issue such certificates. The report then points out that this leaves the city without adequate means of raising sufficient money to purchase the lines and hence the provisions of the ordinances along this line are meaningless. It is furthermore pointed out that it is equally certain the city will never be able to find a licensee who will purchase the properties under the 1907 ordinances. The report states that according to the terms of the 1907 ordinance the companies can continue to operate their lines in the streets of the city until the city or its licensee pays to them the purchase price built up under the ordinances. This price, it is contended, includes from $85,000,000 to $90,000,000 of "water."

FIVE-CENT FARE ENTIRELY POSSIBLE

> So the city is helpless and the present companies can remain on the streets forever if these ordinances shall hold. Even if the courts should finally hold that the provision above is illegal, fraudulent and void the city would be in no position financially to acquire and operate a street railway system, because of the constitutional limitation of municipal indebtedness.
>
> So, unless the present companies are to be left in undisputed control, and permitted to continue their operations as they have in the past, it is obvious that the new Transportation District advocated by you (Mayor Thompson) is an absolute necessity.
>
> The question then recurs whether under this plan the people could be given 5-cent fares. Our investigation leads us to the conclusion that there is no doubt that it can be done.

Apparently to prove this statement the report shows that the "earnings of the Chicago Surface Lines under the 5-cent fare from Feb. 1, 1907, to Aug. 1, 1919," were $140,559,475, made up of the following items: 10 per cent of all items added to capital account for contractors' profit retained by the companies and not paid to any contractor but added to capital account; 5 per cent of all items added to capital account for brokerage but retained by the companies and not paid to any broker; 5 per cent of the capital account drawn out each year by the companies; 45 per cent of the net divisible receipts drawn out each year by the companies; 55 per cent of the net divisible receipts paid to the city; and the accumulation in the renewal fund over all expenditures for renewals. After presenting these figures the report draws no conclusions as to how the previous statement is substantiated that 5-cent fares can be had.

In concluding its direct statement the commission says:

> The plan proposed by your Honor, commonly known as the "Thompson Plan for People's Ownership and Operation of Street Cars at a 5c. Fare," if adopted, would obviate all the difficulties which have been heretofore experienced by the people of Chicago, and place it within their power to own and operate their lines of local transportation, if they so desire.

A communication from the engineering department of the commission is submitted as a part of this report. This is signed by George W. Jackson, engineer for the commission. In this Mayor Thompson is again assured that his plan is feasible and that under it the people can own and operate street cars in Chicago successfully at a permanent 5-cent fare. Mr. Jackson says:

> I am further able to say that such plan could be put into execution without adding any permanent burdens to the taxpayers of Chicago, and in my opinion the Transportation District contemplated in such plan would give the people of Chicago better local transportation than they have ever heretofore enjoyed.
>
> The present conditions in local transportation are mainly due to overcapitalization upon the part of the companies and their efforts to maintain unwarranted values on their properties and to make their lines earn dividends on inflated valuations by taking out of the pockets of the people the largest possible amount of money for the least possible amount of service.

The total report on the engineering work done for the commission is given in the following paragraph:

> The engineering features to be considered, of course, involve subway construction, at least to the initial extent of serving congested areas, with the possibilities of sufficient extensions to meet the needs of the future. Subway construction, however, is not vitally essential to the success of the Mayor's plan, but can be combined with it harmoniously and practically at any time. The re-routing of surface traction lines in the downtown business section under plans whereby 200,000 passengers an hour could be brought into or taken out of the loop, as compared with 100,000 passengers an hour under the present service, should be done. An increase in the average speed of surface cars accomplished through economies of routing and operation will bring perceptible relief, and the use of double-deck street cars and loading platforms for collecting fares, thus increasing capacity and eliminating the delay occasioned by payment of fares on the cars, will bring still greater relief.

DRAFT OF PROPOSED ENROLLING ACT

Mr. Jackson concludes his portion of the report with the following statements and explanation of how substantial savings in operating expenses may be made:

> The daily saving in expense referred to will total, conservatively estimated, $40,000 a day. This saving computed on the basis of 300 days yearly will equal an annual saving of $12,000,000. Included in this estimate are the following items:
>
> Elimination of the present Board of Supervising Engineers and the cost of service and rate investigations to the companies and the city by the Public Utilities Commission.
>
> Discontinuance of the employment of detectives and spotters through the sale of tickets to passengers before entering cars.
>
> Gain in revenue which will accrue through the sale of tickets instead of the payment of cash fares.
>
> Saving on payrolls of employees replacing switches and making repairs and renewals of trackage, which are now exorbitant.
>
> Saving in expense of operation by maintaining an average speed of 12 m.p.h. instead of 10 m.p.h., which is the present average.
>
> Saving by operating cars by the loop system in the downtown district and at a number of terminals.
>
> Saving of unnecessary overhead expense, costs of administration, lawyers' fees, legal expenses, and lobbying.
>
> Generation of their own power by people's lines, instead of purchase of same from private generators and distributors.
>
> Saving in purchases of equipment and supplies in open competition, instead of from concerns in which owners of traction capital are interested.

The printed report also contains the proposed enabling legislation which would create the Transportation District controlled by six trustees elected by the people of the district to provide a system of local transportation. The full control of such system would be vested in the board of trustees. The only restriction imposed is that in no case shall the rate of fare exceed 5 cents per person for a continuous trip in the same general direction wholly within the limits of any incorporated city within the Transportation District. This fare is not to be subject to the control of or review by any governmental agency of the State.

"Mayor Thompson's Traction Commission" was appointed on Sept. 9, 1919. The sum of $250,000 was appropriated for the expenses of its investigation. Of this amount $180,000 was spent. It was charged with two principal considerations; namely, is people's ownership and operation of the traction lines feasible, practicable and desirable; and will a permanent 5-cent fare be guaranteed thereunder?

The commission began its work by adopting a resolution wherein it was agreed that, inasmuch as the Illinois Public Utilties Commission was shown by its rulings in favor of the public utility corporations and against the interest of the people, it is vain to look for relief to that commission, and that, since the Supreme Court of Illinois had held that the State Public Utilities Commission had no jurisdiction over public utilities owned and operated by municipalities in the State of Illinois, arrangement should be made to appeal to the General Assembly for legislation authorizing the people to create a Transportation District or new municipal corporation, if they so elected, for the ownership and operation of the railway, at a 5-cent fare in accord with the so-called "Thompson plan."

Coup d'État by Municipal Line

Detroit United Official, About to Serve Injunction, Arrested and Marooned on Island Over Night

The Street Railway Commission of Detroit, Mich., succeeded on Sunday, Jan. 9, in crossing the Mack Avenue tracks of the Detroit United Railway at St. Jean Avenue with the Charlevoix-St. Jean line, the first municipal ownership route that it is proposed to start in operation, after E. J. Burdick, assistant general manager of the Detroit United Railway, had been taken to Belle Isle by Detroit policemen and detained there by the opening of the draw span in the bridge that connects the island with the mainland.

A TEMPORARY restraining order had been issued by Judge Harry Dingman to prevent the Street Railway Commission from crossing the tracks of the Detroit United Railway and it was while serving this order that Mr. Burdick was arrested by the police and hurried away from the scene in a patrol wagon.

About 200 policemen were in the vicinity of the crossing, having been assembled there at the order of Police Commissioner Inches. In a statement to John C. Lodge, acting Mayor at the time of forced crossing, Police Commissioner Inches said in explanation of the treatment accorded Mr. Burdick that Commissioner Martin of the Department of Public Works, Mr. Goodwin, manager of the Municipal Railway, and Ross Schram, secretary of the Street Railway Commission, all had informed him Saturday night that they were going to do some work at the corner of St. Jean and Mack Avenues, and asked protection as they feared trouble. Mr. Inches instructed Superintendent Rutledge to provide a force which would be able to take care of any trouble which might develop and it was decided to throw a cordon of officers around the men who were at work and thus prevent a crowd from gathering.

The number of men assigned to the job was increased when it became apparent soon after the work was started that the Detroit United Railway was massing some heavy equipment on its tracks and on the adjacent streets a short time before the work was begun. Not far from the contemplated work a heavy wrecking train of the Detroit United Railway was idle on that company's track and in the other direction a snow plow was stationed and motor trucks were awaiting on adjacent streets.

According to the statement by Mr. Inches, trouble began as soon as work was started. A large motor truck belonging to the railway was driven right through the gang of men who were starting the work and was abandoned at a point where it would entirely obstruct traffic on the street. Shortly after Mr. Burdick was observed among the men. The natural inference, according to the Police Commissioner, was that he was getting word to the wrecking trains and snow plow and other equipment to get into the fight, and he was removed from the scene of work and taken to the station for investigation.

According to Mr. Burdick the police attempted to prevent him from serving the temporary injunction. It is held, however, that service was made, inasmuch as it is only necessary that the one on whom the injunction is served be informed of the nature of the paper.

Ross Schram, secretary of the commission and also secretary to the Mayor, is credited with having supervised preparations for crossing the Mack Avenue line with the municipal rails. The Commissioner of Public Works, Mr. Inches and Mr. Goodwin are believed to have received their instructions from Mr. Schram.

As a result of the forced crossing, action was started in the Circuit Court, where the Detroit United Railway brought suit to force the city to abandon the crossing. The company also seeks permanently to enjoin the street railway commission for crossing its lines. Elliott G. Stevenson, attorney for the Detroit United Railway, asked that the city be compelled to restore the company's tracks.

Following the disposal of the first case, suit will be filed for E. J. Burdick for personal damages as a result of his alleged false arrest and his retention until morning by the police in an effort to prevent his serving the temporary injunction on city officials.

Voluntary Ten-Hour Day

Public Service Railway Employees Go on This Basis in Spirit of Mutual Helpfulness

A voluntary concession has been made by 4,000 trainmen employed by the Public Service Railway, Newark, N. J., to work ten hours a day for a six-month period instead of the nine hours now put in. This will bring about a rearrangement of runs. William Wepner, state chairman of the union, made the announcement on Jan. 13. He said that only about twenty out of a total membership of more than 4,000 men in the union voted against the proposition. Mr. Wepner said:

> The company has treated us better than we expected since our agreement made after the last strike. When we learned a month or so ago that a policy of retrenchment was to be adopted by the company we decided to do what we could to show our appreciation.
>
> The War Labor Board said a nine-hour day at the pay we were receiving for ten hours was fair. We have been paid at that rate since making an agreement with the company. It meant, though, that some of the men longest in the business would receive about $60 a week. I refer to about five per cent of our membership. This exceptional wage was a combination of the regular wage earned and overtime paid for several hours each day, which was not earned, in a sense, because the men were not compelled to remain at the carhouses.
>
> There are some of these men whose runs end at about 2 o'clock in the afternoon. The company needs them during the rush hour. Under the agreement, the company had to pay these men at a rate of time and a half for the three hours they loafed. They could be at their homes or anywhere, so long as they report to take out cars at 5 o'clock. This averaged $2.50 or more for each of about 500 men for almost every day in the year.
>
> We decided that, as the first step to help the company in its emergency, we would do away with this system. We planned a ten-hour day and a rearrangement of runs, so that these men would not have that loafing period. It was put before the union at fully attended meetings and agreed upon. I went into conference with President McCarter of the company and told him my plan. He assured me that he had intended no wage reduction for the men because of the financial difficulties he was facing and accepted the plan I offered. It will take about two weeks to put it into effect.

John L. O'Toole speaking for the company said:

> It is true that conferences have been held between the operating officers and representatives of the motormen and conductors looking to a readjustment of schedules that will be helpful in keeping down expenses. In fact, the relations between the company and its employees have been growing increasingly cordial for more than a year, and when the fact became evident that the company was not meeting its operating expenses the representatives of the men showed a commendable co-operative spirit and evinced a willingness to lend aid. As a result of many conferences the employees are accepting readjusted schedules of work which help to keep the costs from going higher.
>
> In some instances these schedules extend the day's run a little, but the contract hourly rate of pay is not altered. Some changes have already been made and, while it is not possible to measure results in dollars, even approximately, the real promise of value is the anticipated outcome of closer co-operation between employees and company in the operation of the cars and the supplying of better service.

Municipal Road May Start Service Feb. 1

According to Joseph S. Goodwin, general manager of the Detroit (Mich.) Municipal Railway, service will be instituted on the first of the municipal lines on Feb. 1. The first cars will be operated over the St. Jean lines to Charlevoix Avenue and thence east to Alter Road, a distance of about 4 miles.

Work is being carried on with a view to progressing as rapidly as possible with other municipal lines. With the advent of cold weather and the necessary slackening up of construction all equipment which has been procured for and used on the municipal lines is being overhauled and put in good condition in order that no delays will be experienced when the construction season again opens.

Chicago City Administration Attacked

In a call for the annual meeting on Feb. 8 of the Chicago City & Connecting Railways Collateral Trust, which holds the stock of the Chicago City Railway, an attack is made on the attitude of the Mayor of Chicago and the city administration toward the traction companies. The statement points out how seriously the activities of the company in providing additional facilities have been handicapped by the continual litigation with the city. In short, the city officials have continued to make political capital of the requirements of the traction companies despite the fact that this very attitude has made it virtually impossible for the companies to give adequate service.

Receivers Explain Accident

As a result of the fatal accident on a line of the Pittsburgh Railways, Pittsburgh, Pa., referred to in the ELECTRIC RAILWAY JOURNAL, issue of Jan. 8, the receivers of the company, Charles A. Fagan, W. D. George and S. L. Tone, at the conclusion of an all-day session of inquiry, issued the following statement:

> Investigations are being made regarding the accident which occurred last Monday evening during the rush hours, but it has not been possible to determine the direct cause of the same.
>
> For the purpose of impressing upon the employees of the railways company the necessity for following out rules of a similar nature previously made the receivers directed the posting of the following rule as to the operation of cars on the system:
>
> Motormen and conductors are hereby directed and ordered, that hereafter while operating cars in their charge, if brakes, or any portion of the equipment connected to the brakes do not operate properly they shall hold the car in its then position on the street until a following car can be coupled to it, and then proceed with such car to either the nearest car barn or to a switch where that car can be removed from the main track.

City Councilman John F. Dailey introduced a resolution compelling the railway to install safety chains on every car hauled by another car in which passengers are carried. Three separate investigations are now being conducted into the causes of the accidents.

News Notes

Cleveland Interest Fund Low.—The falling off of the number of car riders on the lines of the Cleveland (Ohio) Railway has been so great since the maximum rate of fare went into effect that the interest fund, which is the fare barometer, has continued to drop instead of showing the expected increase. On Dec. 1 the interest fund had dropped to less than $60,000.

Wages of Way Men Reduced.—The New Jersey & Pennsylvania Traction Company, Trenton, N. J., has announced a reduction of 20 per cent in the wages of the employees of the maintenance of way department. Gaylord Thompson, general manager of the company, declares that the readjustment of the wage scale is in keeping with present conditions and that the new wages correspond with the scale recommended by the War Labor Board some time ago.

Wants Street Intersections Improved.—Commissioner Barbur has announced that unless street intersections traversed by the railway lines of the Portland Railway, Light & Power Company, Portland, Ore., are repaired immediately and put in proper condition he will appeal to the Public Service Commission for relief. The commissioner states that he has repeatedly urged executives of the railway to make repairs at street intersections but that nothing more than temporary repairs have been made.

Information Committee for Wisconsin.—The Wisconsin committee organized for the purpose of distributing information about the public utilities to the public has begun to functon. This committee is conducted under the name of the Wisconsin Public Utilities Bureau, by the Wisconsin electrical, gas and telephone associations. Headquarters of the bureau are at 445 Milwaukee Street, Milwaukee, Wis. Frantz Herwig is director. Publication of a bi-weekly news bulletin for the use of newspapers has been started.

"All Together" at Camden.—The Public Service Railway at Camden, N. J., is issuing periodically under the direction of George A. Rothery a leaflet, entitled "All Together." By means of this pamphlet Mr. Schreiber, chief engineer of the Public Service Railway and manager of the Southern Division, is able to keep in close touch with his employees. In this paper such subjects as accidents, jitneys, etc., are discussed. In a recent number of Vol. 1 an urgent appeal is made to the men to try to co-operate with the company officials in securing the good will of the public. The paper states: "Please tell our patrons that the company welcomes any communication by word or by letter of any complaint, criticism or commendation about the railway and any such communication will be acknowledged and receive sincere, careful and intelligent consideration."

Programs of Meetings

Canadian Electric Railway Association

The members of the Canadian Electric Railway Association will meet at the Chateau Laurier, Ottawa, Ont., on Jan. 31 and Feb. 1.

C. E. R. A. Meeting Postponed

The annual meeting of the Central Electric Railway Association, which was announced for Jan. 27 and 28, has been postponed until Feb. 24 and 25.

National Civic Federation

Outstanding industrial problems, with which the American people are confronted today, from both the national and the international viewpoints, will be discussed at the twenty-first annual meeting of the National Civic Federation, to be held at Hotel Astor, New York City, Feb. 14, 15 and 16.

It will be the purpose at the Civic Federation's meeting to make so clear the difference between the sane, patriotic American labor movement and the labor movements of Europe that the so-called Liberal groups in the United States cannot longer becloud the situation.

The program for the federation's annual meeting will include, in addition to topics indicated by the problems presented in the foregoing, reports from its workmen's compensation department, social insurance department and the new department on study of revolutionary movements.

During the past year through fifteen sub-committees the last-named department made an extensive study of the extent to which the revolutionary forces in this country have penetrated the various groups making up our citizenry: Labor, agriculture, the church, the college, the public school, philanthropic agencies, negro and foreign groups, and women's organizations.

This investigation, says Ralph M. Easley, chairman of the executive council of the federation, has resulted in some amazing revelations which call for most serious consideration by those who believe that the institutions of our country should be safeguarded against the "boring from within" policies of the Socialists, I. W. W.'ites and bolshevists.

The sessions of the woman's department, to be held on the third day, will include consideration of the questions it has been studying during the past year, such as public health education, immigration and naturalization, the educational system and its needs and the dangerous radical tendencies of the times as they affect American citizenship.

Financial and Corporate

Reading Property Evaluated

Cost of Reproducing and Developing the Property Included Based on Present Prices, Average Five-Year Prices and Historical

At the hearing of the Public Service Commission of Pennsylvania held on Jan. 5, 1921, in Harrisburg, A. L. Drum & Company, consulting engineers of Chicago and Philadelphia, presented on behalf of the Reading Transit & Light Company, a final report on the cost of reproducing and developing the electric railway properties of the Reading company. In accordance with the public service law of Pennsylvania the engineer's report comprises: (a) An estimate of the present-day cost of reproducing and developing the property. (b) An estimate of the cost at various fair average prices of reproducing and developing the property. (c) A statement of the historical cost including the developmental cost of the property.

A COMPARISON of the costs of reproducing the property on the several bases is contained in the accompanying table, which shows that the cost of reproduction on the basis of 1919 prices is 53.77 per cent in excess of the cost of reproduction based on average prices for the five years ending Dec. 31, 1917. The historical cost of the company's property is found to have been $6,150,687. This corresponds very closely with the cost to reproduce the physical property new on average pre-war prices.

The developmental costs as shown on the accompanying table are reported as specified in the Pennsylvania law and represent a measure of the developmental and going concern value of the property and indicate the costs that have been or would be encountered in creating and developing the property to its present state of efficiency and unification. The developmental costs are segregated under two heads, one consisting of the cost of unifying the system, representing an estimate of the cost incident to the creation and consolidation of the various companies now comprising the Reading Transit & Light Company into one operating company with the resulting benefits accruing to the public through the efficiencies and economies of operation and the reduction in fare due to free transfers established by reason of the unification of the system.

UNIFIED SYSTEM CONSISTS OF THIRTEEN COMPANIES

The unified system of the Reading Transit & Light Company, Reading Division, consists of some thirteen companies, six of which were merged into the Reading Transit & Light Company on Sept. 12, 1917, six are operated under lease and one is operated through stock ownership. During the historical development of the company twenty-six companies were chartered, with a final reduction to thirteen companies through mergers and sales. The other developmental cost consists of the loss of interest during operation and represents the deficit of return on the investment during the early period of operation up to the time the business had become established on a paying basis.

	Basis No. 1 Average Prices 1913 to 1917, Inclusive	Basis No. 2 Average Prices 1914 to 1919, Inclusive	Basis No. 3 Average Prices 1919
Physical property:			
Cost to reproduce new	$6,440,112	$7,642,424	$9,903,165
Developmental cost:			
Cost to unify system	487,000	487,000	487,000
Loss of interest during operation	450,808	534,970	693,221
Total developmental cost	$937,808	$1,021,970	$1,180,221
Total cost of reproducing and developing the property	$7,377,920	$8,664,394	$11,083,386

A summary of the cost of reproducing and developing the property under the various methods is as above.

The accrued depreciation as reported in the appraisal represents the amount of existing depreciation due to wear and use, as ascertained and determined by inspection and measurement in the field and is not based on theoretical depreciation due to age or obsolescence. The amount of accrued depreciation ascertained under the basis where average prices 1913 to 1917 were applied amounted to $709,983; on the basis of average prices 1914 to 1919 it amounted to $884,476; and on the basis of average prices during 1919 it amounted to $1,197,737.

READING DIVISION OPERATES RAILWAY

The Reading Division of the Reading Transit & Light Company owns or leases and operates the railway system in the city of Reading with suburban lines radiating from Reading through intermediate boroughs and to the villages of Womelsdorf, Adamstown, Birdsboro, Temple, Boyertown and Stony Creek. The property principally consists of 101.97 miles of track (gage 5 ft. 2½ in.), of which 36.48 miles are located in Reading and the remaining 65.49 miles in the Suburban Division; 141 passenger cars, thirty service cars; two main carhouses and shops; two office buildings, used jointly by the railway and the Metropolitan Edison Company, and miscellaneous buildings, waiting-stations, bridges, land, etc. Power is purchased from the Metropolitan Edison Company at Reading.

The appraisal was prepared from an inventory made by the railway company as of Dec. 31, 1917, and the reproduction cost as reported is arrived at by applying to the inventory units the actual existing prices for labor and material which prevailed in the community during the periods specified under the three different bases and represent the amounts it would actually cost the company to install the work in place. To the amounts as reported in the inventory and appraisal should be added the capital expenditures from Jan. 1, 1918, to Oct. 31, 1920, amounting to $158,823 to arrive at the reproduction cost as of October 31, 1920.

READING TRANSIT & LIGHT COMPANY

READING DIVISION

Estimated Cost to Reproduce New as of December 31, 1917, Based on Average Unit Prices Prevailing During the Periods Specified

	Basis No. 1 Applying Average Prices, 1913–1917 Inclusive	Basis No. 2 Applying Average Prices 1914–1919 Inclusive	Basis No. 3 Applying Average Prices 1919	Per Cent Increase 1914–1919 Over 1913–1917	Per Cent Increase 1919 Over 1913–1917
Track	$2,035,646	$2,581,478	$3,491,418	26.81	71.51
Bridges	183,750	225,388	295,322	22.63	60.72
Paving	540,587	664,329	1,010,144	22.89	86.86
Electrical distribution system	444,596	499,008	537,494	12.24	20.89
Rolling stock	869,346	1,075,147	1,396,013	23.67	60.58
Shop machinery, shop tools and supplies	26,299	27,966	38,608	6.34	46.78
Buildings	268,339	317,388	458,092	18.28	70.71
Furniture and fixtures	6,883	8,259	12,388	20.00	80.00
Stores, tools and miscellaneous equipment	106,331	107,916	118,028	1.49	11.00
Land	602,039	602,039	602,039	.....	.....
Expenditures not apparent in inventory	14,859	14,859	14,859	.....	.....
Engineering and superintendence	218,313	264,394	347,604	21.11	59.22
Administration, organ and legal expenses	258,872	258,871	258,871	.....	.....
Taxes during construction period	23,858	22,822	20,825	*4.34	*21.71
Interest during construction	391,980	466,891	688,137	19.11	75.55
Working capital	141,742	141,742	141,742	.....	.....
Cost of financing	306,672	363,924	471,579	18.67	53.77
Physical property, total value	$6,440,112	$7,642,423	$9,903,164	18.67	53.77

* Decrease.

Interborough's Deficit Still Decreasing

The Interborough Rapid Transit Company has been steadily decreasing the deficit in its net income from August, 1920. That month the Interborough showed a deficit of $658,000, and in its latest report for November the figure is down to $261,000, against a $155,227 deficit for November, 1919. In its five months' statement ended Nov. 30, after subtracting interest, rentals, etc., the company lost $2,381,357 against $1,898,196 for the corresponding period of last year. In November, 1920, the Interborough carried 86,466,512 revenue passengers, an increase of 8,028,271 over 1919.

INCOME STATEMENT OF THE INTERBOROUGH RAPID TRANSIT COMPANY

Month Ended Nov. 30:	1920	1919	Percentage Change Over 1919
Gross operating revenue	$4,813,587	$4,286,850	12.3
Operating expenses	3,124,459	2,619,757	19.3
Net operating revenue	$1,689,128	$1,667,093	1.3
Total taxes	217,218	211,949	2.5
Income from operation	$1,471,910	$1,455,144	1.2
Non-operating income	52,230	42,864	21.9
Gross income	$1,524,140	$1,498,008	1.7
Interest rentals, etc., including Manhattan Guarantee	1,785,570	1,653,235	8.0
Net Corporate Income (exclusive of accruals under the provisions of Contract No. 3 and related Certificates which under these agreements with the City are payable from future earnings)	*$261,430	*$155,227	—68.5

* Deficit

Five months ended Nov. 30:	1920	1919	Percentage Change Over 1919
Gross operating revenue	$21,989,323	$19,531,958	12.6
Operating expenses	14,798,444	12,319,269	20.0
Net operating revenue	$7,190,879	$7,212,689	— 0.3
Total taxes	1,090,437	1,068,960	2.0
Income from operation	$6,100,442	$6,143,729	— 0.7
Non-operating income	260,159	217,941	19.4
Gross income	$6,360,601	$6,361,670	— 0.02
Interest, rentals, etc., including Manhattan Guarantee	8,741,958	8,259,866	5.8
Net Corporate Income (exclusive of accruals under the provisions of Contract No. 3 and related Certificates which under these agreements with the City are payable from future earnings)	*$2,381,357	*$1,898,196	—25.5

* Deficit.

Improvement in American Cities Company's Affairs

The committee headed by J. K. Newman representing the deposited 5-6 per cent collateral trust bonds of the American Cities Company reports favorable progress in the development of the subsidiary properties of the American Cities Company. As soon as operating figures for 1920 have been completed a report will be made covering the operation and financial position of each of the subsidiary properties.

Recent statements of earnings of the subsidiary companies indicate that those companies are on a basis where their combined net earnings are more than sufficient to pay interest on the American Cities Company 5-6 per cent collateral trust bonds after setting aside ample renewal and replacement funds in addition to adequate maintenance expenditures. However, the subsidiary companies have declared no dividends, as the surplus earnings have been used to better the physical properties.

While a complete reorganization plan has been prepared, the committee considers it inadvisable to submit it under the present financial conditions. The committee in consequence recommends that the deposit agrement of Jan. 15, 1919, be amended so that the time for the submission of a plan thereunder be extended to Dec. 31, 1921, and that the deposit agreement as so amended be extended and renewed.

Interborough Meets Interest Payment

Arrangements completed on Dec. 30 give the Interborough Rapid Transit Company, New York, N. Y., a six months' extension on its 7 per cent notes, which fell due on Jan. 1. The company planned to pay the interest due the first of the year on the 5 per cent bonds amounting to $3,800,000 with cash accumulated through operation of its lines.

The following statement was issued by Frank Hedley, president and general manager of the Interborough:

> My attention has been called to a statement on the news ticker that the Interborough Rapid Transit Company will be saved from receivership on Jan. 1, 1921.
>
> The Interborough Company has been successful in securing an extension of its notes of $2,900,000 for six months, and as a result of this, and by adopting the policy of paying some of its obligations as it may be possessed with cash after Jan. 1, the company will be able from the cash on hand and which it expects shortly to receive, to meet its obligations, but the company has not been able to negotiate any loan for new cash.

Brooklyn City Officers Re-elected

At the annual meeting of the stockholders of the Brooklyn (N. Y.) City Railroad the following directors were elected: Frederick L. Allen, William N. Dykman, Richard L. Edwards, Crowell Hadden, Alfred R. Horr, Frank Lyman, Edwin P. Maynard, Henry F. Noyes, H. Hobart Porter, Dick S. Ramsay, Hiram R. Steele, James Timpson and Harold T. White.

Frank Lyman, the president of the company, presided at the meeting. H. Hobart Porter, vice-president and general manager, in response to questions by stockholders, stated that the gross earnings of the road now aggregated about $200,000 weekly. Mr. Porter told of the difficulties encountered by the management since the Brooklyn lines resumed independent operation on Oct. 19, 1919, stressing particularly the expense incurred through the recent strike and the heavy snow fall of last year. Necessary improvements in equipment and other operating detail he mentioned as additional large sources of expenditure.

Mr. Porter reiterated to the stockholders the statement addressed to them in his recent letter, emphasizing the necessity of a higher fare if the road were to gain a sound financial position.

Mr. Lyman was re-elected president of the Brooklyn City Railroad at the meeting of the directors on Jan. 11 and Mr. Porter was re-elected vice-president and general manager. Mr. Porter has had charge of the Brooklyn City system since independent operation was resumed. Mr. Lyman has been president of the company since 1911. Henry F. Noyes was elected vice-president; S. B. Olney, secretary; and George W. Jones, treasurer. Other officials chosen were: Clinton E. Morgan, assistant general manager; E. H. Reed, auditor; L. E. Sharpe, assistant secretary and treasurer; William Siebert, superintendent of transportation; and James T. Grady, publicity director. Mr. Morgan has been identified with the Brooklyn City Railroad since the lines were taken over by their owners.

Equipment Trust Certificates Offered

In its January circular the bond department of the Chicago Trust Company describes the equipment trust 8 per cent gold certificates of the J. G. Brill Company, issued for subscription at 100 and accrued interest. The certificates mature serially. They are in coupon form in denominations of $1,000 and $500. These certificates are issued by the Chicago Trust Company, trustee, under the "Philadelphia Plan," and are secured by Birney one-man safety cars, built by the J. G. Brill Company, and equipped by the General Electric Company and the Westinghouse Airbrake Company. Purchase contracts and notes covering the sale of the equipment are pledged as additional security with the trustee, and title remains in the trustee until all outstanding certificates have been retired. The cars securing these certificates are operated by well-known, successful companies, including the Iowa Railway & Light Company, the Houston Electric Company, the Puget Sound Power & Light Company, the Tampa Electric Company and others. The certificates represent approximately 63 per cent of the purchase price of the cars, the balance having been paid in cash and junior securities.

Valuation Has Small Effect on Rate of Fare

A recent issue of the *N. O. T. & L. News*, which is distributed to the patrons of the railway lines of the Northern Ohio Traction & Light Company in Akron, Ohio, brings out an interesting point as to the effect of the valuation figures on the rate of fare. The new service-at-cost franchise being negotiated at Akron contains a provision that the property shall be valued by a commission after the franchise is put in effect. As usual, some opponents to the plan are making much capital of the fact that the property has not been valued, and that this will have a very material effect upon the rate of fare should a high valuation be placed after the contract is entered into. The comment follows:

> Suppose the Akron city system was valued at $5,000,000, the interest charge (7 per cent) would be $350,000 annually.
>
> Suppose the balance of the expense was $2,650,000 annually.
>
> Suppose the company carries 60,000,000 passengers annually, as it probably will within the next year.
>
> The fare would be just 5 cents.
>
> Now suppose the system was valued at $6,000,000, what difference would it make in the fare?
>
> A little more than one mill.
>
> If the system were valued at $7,000,000 the difference would make a little more than 2 mills; if $8,000,000, a little more than 3 mills, and so on.
>
> It would require an increase of more than $4,000,000 to make a difference of 1 cent in the fare.
>
> Why talk about the valuation regulating the fare?
>
> It's the price of labor, cost of upkeep of track and expense for equipment, coal, etc., that regulate fares.

Statistics of Express Companies

Statistics of the mileage covered by the national express companies in the United States have just been published by the Interstate Commerce Commission. They follow:

	1919	1918
Kind of mileage:		
Steam road	238,354.22	239,282.12
Electric line	3,523.75	6,951.25
Steamboat line	31,060.87	40,410.12
Stage line	906.42	1,175.42
Total mileage	273,845.26	287,818.91

The figures during 1919 are those of the American Railway Express Company and in 1918 of that company and some smaller companies absorbed by it during 1918.

Prospects Good for Financial Rehabilitation

J. R. Baggett, of Lillington, N. C., who was recently appointed by the North Carolina courts as a temporary receiver of the Cumberland Railway & Power Company, which owns and operates a number of public utilities in the State of North Carolina, is reported to have stated that in examining in Norfolk the inventories, books, etc., he regards the physical properties of the company to be worth approximately $500,000. This, he states, is based on a very thorough appraisal made by the Appraisal Company of the South as of March 15, 1920, and upon his inspection and examination of the company's properties.

He further states that there are somewhat less than $500,000 of bonds apparently outstanding. His information is that the Corporation Commission of North Carolina values the properties of the company for tax purposes at more than $400,000. Mr. Baggett is said to feel that giving publicity to unfounded rumors and to information manifestly unreliable would tend to prejudice very seriously the rights of the company's security holders.

He is quoted by the *Virginian-Pilot* of Norfolk as follows:

> Mr. Baggett is of the opinion that if his plans in regard to the company's management can be carried out the security holders of the company will be amply protected and that no loss will be sustained by either the bondholders or the creditors. Mr. Baggett assigns the reason for the company's embarrassment and the receivership petition more to the financial stringency which prevented the obtaining of ready funds for development than to an insolvent condition. He says that he has the unqualified co-operation of the officers and directors of the company, with a view to putting the company on its feet and feels that if the bondholders and others interested will show the proper spirit of co-operation the company will ultimately prove a very profitable venture.

Financial News Notes

Abandonment at White Plains Approved.—The Public Service Commission for the Second District of New York has approved abandonment by the Westchester Street Railroad of its Westchester Avenue line in White Plains but has declined to approve a declaration of abandonment by the company of its Mamaroneck line.

Short Stretch Is Abandoned. — The Southeastern Ohio Railway, Zanesville, Ohio, was authorized by the Public Service Commission to abandon its Mill Run line on Dec. 31. The line extends for 1 mile from North Sixth Street, out Sixth, on Howard, North Seventh, Price, Fernanda and Hall Avenues to the Mill Run depot of the Ohio River & Western Railroad.

Maumee Lines Operate Leased Equipment. — The Maumee Valley Lines, being operated by Raleigh D. Mills, receiver, are using cars rented from the Toledo Railways & Light Company at $5 a day each. What the railroad will do when the cost-of-service franchise goes into effect and the cars are turned over to the Community Traction Company is problematical.

Abandonment Application Withdrawn.—The Public Service Commission for the Second District of New York has authorized the Geneva, Seneca Falls & Auburn Railroad to withdraw its application for authority to cease operating that part of its line between Garden Street in Seneca Falls and Cayuga Lake Park. This action follows a hearing before Commissioner J. A. Barhite, who recommended a closing of the company's application to cease operations.

Restoration Suit to Equity Court.—Judge Thomas H. Darby, of the Common Pleas Court of Hamilton County, Ohio, has refused to appoint a Master Commissioner to hear the suit for $350,000 and accounting filed by the city of Cincinnati against the Cincinnati Traction Company. In his official capacity as Presiding Judge of Common Pleas Court, Judge Darby said he would send the case for trial to one of the equity courtrooms as soon as the parties of the suit are ready for trial.

Greenville Road Purchased.—In the matter of the purchase of the railway system at Greenville, Tex., by the city, referred to in the ELECTRIC RAILWAY JOURNAL on Jan. 1, 1921, the property included was that of the Greenville Railway & Light Company, which connects Greenville and Peniel. There were originally two systems in Greenville; namely, the Greenville Railway & Light Company and the Mineral Heights Street Railway. The latter company abandoned service some time ago, although the tracks of the railway still remain in the streets.

Dividend Reduced.—The directors of the American Light & Traction Company, New York, N. Y., have declared a quarterly dividend on its common stock of 1 per cent in cash and 1 per cent in stock. In the preceding quarter 1 per cent in cash was distributed in addition to 1½ per cent in stock. From 1910 to July, 1920, the company has maintained an annual rate of 10 per cent cash and 10 per cent stock. In July, however, a quarterly dividend of 1½ per cent cash and a like amount in stock was declared. Three months later the cash payment was made 1 per cent. The regular dividend of 1½ per cent on its preferred was declared, all dividends being payable on Feb. 1 to stock of record on Jan. 14.

Thrift Campaign in Blue Grass District.—The Lexington (Ky.) Utilities Company is conducting a bond-selling campaign in the interests of Kentucky utilities. The offering consists of first lien and refunding 6 per cent gold bonds in $50, $100, $500 and $1,000 denominations to yield more than 7 per cent. Bonds may be purchased for cash or on a time plan. In an effort to interest the people of Lexington and its surrounding vicinity in home industries instructive and attractive circulars have been issued by the company. These circulars contain pictures of electric shops and power houses and depict what the lighting company in the Blue Grass district has done and is doing in the way of service. "Invest in home industries and help make your community a bigger and better one" is the direct appeal of the Lexington Utilities Company to the residents of Lexington and vicinity.

Traffic and Transportation

Service Order for Chicago

Illinois Commission Orders Safety Cars, Trailers, Loop Rerouting and Skip Stop Continuance

The Public Utilities Commission of the State of Illinois on Jan. 3 issued an order to the Chicago Surface Lines to continue skip-stop operation, to install safety cars on certain lines, to proceed to use trailers and to work on a rerouting plan for the down-town loop district. This new service order was issued after a series of hearings, looking toward improvement in the service rendered by the surface railways.

The skip-stop plan ordered is that which is now in force and which was installed by City Council ordinance during the war, as a coal conservation step. There has been a good deal of agitation that the skip-stop should be abolished, but the commission points out that this plan has resulted in greater efficiency and decreased running time, enabling the railways to carry more passengers with the equipment available. In view of this saving in operating expenses and better service to the public, the commission orders that the companies continue to carry out the skip-stop plan of operation now in effect until further notice from the commission.

ONE-MAN CARS APPROVED

With regard to one-man safety cars, the commission states that the railways are authorized and ordered to procure and install these cars at the earliest date possible, on such lines and at such times as the traffic is light and their use would make possible a more frequent or better service, or would release heavier equipment for use on other lines. The commission's order places a definite limitation on where such cars may be used by stating that they shall be operated in day service only on those lines outside the loop where the headway between cars during morning rush hours is not less than 7 minutes; and in night service on those lines where the headway between cars is not less than 15 minutes.

In its order on the operation of trailers, the commission referred back to a service order dated Sept. 29, 1915, in which it pointed out that the use of trailers would increase the capacity of the tracks and that their use is practicable and feasible, but stated that there was doubt whether the use of trailers was justified at any other time than during the rush-hour period. In the new order the commission rescinds this earlier finding and orders the use of trailers on such lines and at such times (all day or in rush hour only) as the density of traffic is great and the use of trailers would result in greater accommodation and better service.

The commission further orders the companies to prepare and submit to it within sixty days preliminary plans for such rerouting and switchback and turnback service as the company may deem practicable and effective in facilitating the movement of cars and reducing the congestion of traffic in the loop.

It will be recalled that the Chicago Surface Lines has already purchased and received ten standard one-man safety cars which to date have not been placed in operation. It also has under construction in its West Side Shops, fifty trailer cars. There has been some opposition on the part of trainmen to operating safety cars.

Eight Cents in East St. Louis

The Public Utilities Commission of Illinois, after more than two years' deliberation on the application of the East St. Louis (Ill.) Railway, a part of the East St. Louis & Suburban Railway, for permission to charge increased fares, has made a ruling as one of its final acts granting the company's request.

The ruling is that the permanent fares on cars in East St. Louis shall be 8 cents for an adult single fare, two adult tickets for 15 cents, and 3 cents for children, cash or ticket fare. The present fare is 8 cents for adults and 4 cents for children. The new order is effective at once.

The award was made on an application filed in 1918 for increased rates. At the time the appeal was made fares were 5 cents for adults and 2½ cents for children. The company asked for a 6-cent rate for adults and 3 cents for children. A temporary order to that effect was made and the City Council adopted a resolution giving approval of the increase. While the temporary rates were in effect the commission started an investigation to ascertain the value of the company's property as a basis to figure the rate of income the company should receive in order to meet its obligations.

While the commission was engaged in conducting hearings and using experts to determine the valuation of the property the company filed two amendments to its petition, one for a 7-cent fare and the other for an 8-cent fare. No action was taken on the 7-cent fare application, but the commission granted permission to the company to charge 8 cents for adults and 4 cents for children as a temporary measure. This order was issued about six months ago to permit the company to take care of an increase in wages.

When the 6-cent fare was granted an appraiser appointed by the commission fixed the company's valuation at $1,560,000. The company contended the valuation was too low.

Ticket Rate Advanced

Railway at Santa Cruz Authorized to Sell Six Rides for Fifty Cents —Cash Fare 10 Cents

The Union Traction Company has been authorized to increase its fares in Santa Cruz, Cal., and vicinity by the sale of six rides for 50 cents instead of eight. The Railroad Commission in an order issued on Jan. 4 says, in reference to the fact that the company has not asked for a rate sufficient to yield a return on its investment:

> We have given careful consideration to the return secured in the past and to the extent to which the earnings may be increased as a result of the increased fares sought, and while the moderate advance to be made in the fares may solve the problem and retain to the community the transportation service which it needs in order to continue to grow and prosper, it is difficult to escape the conclusion, in the face of the competition by automobiles, mostly vehicles operated for private family use, that the limited number of riders now patronizing a street car system of this kind cannot be expected to pay rates sufficiently high to carry the entire burden.

YEAR'S DEFICIT $35,846

In 1920 the actual loss of the company, as brought out at the hearing of the application to increase rates, totaled $35,846. The commission says that the company is efficiently and honestly managed and that operating expenses have been reduced to a minimum by the use of one-man cars wherever possible. "Further reductions in operating expenses," says the commission, "appear impossible without seriously impairing the standard of the service now being rendered."

The commission points out that prices of materials and labor have greatly advanced during recent years and cites the fact that platform men who, in 1917, were receiving 26, 27, 28 cents an hour, depending upon the length of service, are now receiving 46, 48 and 50 cents an hour. The commission also points out that while the company's gross revenue increased $22,530 from 1916 to 1920 the expenses, in the same period increased $27,066.

The following is also from the commission's opinion:

> At the hearing some objections were entered by certain citizens against the increases in fares, another group of patrons had no objections to urge, the majority frankly declaring that it would be a calamity to the city of Santa Cruz and the outlying districts if the company were forced to discontinue or curtail its service by reason of lack of adequate revenue. The City Attorney, while calling attention to some unsatisfactory service at points along the line, had no objection to the increase in fares and stated that in his judgment the application should be granted.

The commission's order allows the company to continue charging 10 cents for single fares.

New Mexico Road Wants More

The Las Vegas (N. M.) Transit Company has filed an application with the State Corporation Commission for permission to increase its fares from 6 to 8 cents. The company explains that the cost of operating is far in excess of receipts and that its patronage has seriously decreased during the past few months.

Fares Up in Florida

Jacksonville and Pensacola Companies Awarded Advances After Court Insists Commission Shall Act

Awards have been made of a 7-cent fare for the Jacksonville (Fla.) Traction Company and an 8-cent cash fare with 7½-cent tickets for the Pensacola (Fla.) Electric Company. The two companies appealed for 10-cent fares. The rates allowed will not suffice, in the opinion of Peter O. Knight, general counsel for the Stone & Webster subsidiaries in Florida, who argued the case before the Railroad Commission and then before the State Supreme Court, where he won a decision to the effect that a street railway is a railroad. The Railroad Commission assumed jurisdiction after it was ordered by the Supreme Court to hear the appeals.

COMMISSION ASSUMES JURISDICTION

After assuming jurisdiction, the commission, handling both cases jointly, held hearings in Jacksonville and Pensacola, had its experts audit the books of both companies for years back and ordered an appraisal of the companies' properties.

Though the counsel for the Stone & Webster corporation argued that a 10-cent fare would yield only 5 per cent on the commission's own valuation of the properties on the Jacksonville lines and only 3 per cent on the Pensacola property, the orders were prepared with the 7-cent basis in Jacksonville and the 8-cent basis in Pensacola.

In addition the companies in both cities were directed to issue tickets for school children at the rate of ten for 40 cents, to continue to provide transfers and to file special charter rates for review.

The financial difficulties of the Jacksonville corporation go back of November, 1919, when a receiver was appointed by Federal Judge R. M. Call in the District Court. Receivership for the Pensacola company followed in February of 1920. E. J. Triay was appointed in Jacksonville and J. J. Holdzclaw in Pensacola.

COAL PRICE BIG FACTOR

The rapidly increasing price of coal, several increases in wages, arbitrary rulings in Jacksonville that extensions be made, when such were costly and unprofitable, and general conditions in Pensacola, contributed to make conditions worse and worse. The Jacksonville company paid as high as $17 per ton for coal, according to Mr. Knight, and at Pensacola prices ranged almost as high. Old prices had been $3.50.

Conditions were very bad when the first application was made to the Railroad Commission. The commission ruled that it had no jurisdiction over street railways. It held that such roads were public utilities, but not railroads.

Mr. Knight, petitioning for the receivers, asked the Supreme Court for a writ of mandamus directing the Railroad Commission to assume jurisdiction and grant reasonable and just rates. Jacksonville and Pensacola attorneys opposed the action. The State Attorney General and the commission's attorney led the fight against the writ, but Mr. Knight and J. L. Doggett succeeded in securing a ruling that "a street railway is a railway or railroad."

When the commission assumed jurisdiction it disposed of the appeal by granting a part of what was asked.

Valuation Case Argued

Presentation of evidence and examination of witnesses in the case of the city of Knoxville, Tenn., vs. the Knoxville Railway & Light Company, in which the traction concern is seeking a 7-cent fare, was completed before the Public Utilities Commission of Tennessee at Nashville on Jan. 7. The hearing had been in progress four days.

Counsel for the city was given until Jan. 18 in which to file protests. A decision is not expected until a thorough examination is made of the briefs on the part of the commission.

The point at issue before the commission is the value of the traction company's property along with its commercial lighting department. The appraisers for the company and the State made a joint report to the commission. The appraiser for the city of Knoxville refused, however, to sign this report. He made a separate finding in which he placed the value of the company's holdings at a figure about $2,000,000 less than that made by the engineers representing the State and the city.

The report of the engineers with respect to the valuation findings at Knoxville was reviewed in the ELECTRIC RAILWAY JOURNAL for Dec. 25, page 1302. The historical cost was reported as $6,234,141.

More Two-Fare Lines

New rate schedules have been filed with the Public Service Commission for the First District by the Brooklyn City Railroad and by several susidiaries of the Brooklyn Rapid Transit Company increasing the fare for long rides on fourteen Brooklyn surface lines. It is proposed to charge a 10-cent fare by restricting the single-fare zone and, in some cases, by eliminating free transfers.

Filing of the schedules is based on the decision of the Appellate Division of the State Supreme Court that the Flatbush Avenue line has the right to charge a double fare. The decision followed the disorder which attended the effort of the Brooklyn City Company to charge two fares for a through trip. The Public Service Commission restrained the company from making the double charge and the company, appealing to the courts, won the fight. Since then two fares have been charged on this line and the Brooklyn City Railroad and the B. R. T. The commission has suspended the new schedules until March 12, pending an inquiry into the situation.

Railway Must Pay Overtime of Customs Agent at Port of Entry

United States District Judge R. Hazel at Buffalo, N. Y., has denied the application of the International Railway for a permanent injunction restraining the federal collector of customs at Buffalo from closing the International Railway's upper steel arch bridge and the Lewiston bridge at Niagara Falls on Sundays. The bridge crosses the lower gorge of the Niagara River and connects the Dominion of Canada with the United States. The collector of customs notified the railway he would close both bridges to Sunday traffic unless the International paid overtime to the customs agents on duty from midnight Saturday until 7 a.m. Monday.

A temporary injunction was issued, but after hearing the arguments of the government, Federal Judge Hazel ruled that unless the International Railway pays overtime to the customs agents on duty at the bridges, all passengers will be required to deposit all personal baggage, including pocket books, umbrellas, etc., with a customs agent at the bridge until the customs office is opened at 7 a.m. Monday morning. The court ruled the government is not obliged to keep customs agents on duty Sundays and has the authority to close the port of entry unless the expenses are borne by the bridge company, which is owned by the railway.

Nine and One-Half Cent Fare in Prospect

Following the receipt of the annual report of the Cincinnati (Ohio) Traction Company for the year of 1920, W. C. Culkins has forecasted a further increase in fare on March 1. The fare in Cincinnati now is 9 cents cash, with two tickets for 17 cents.

Although figures submitted by the company show that there were over 1,000,000 more passengers during the past year than in 1919, Mr. Culkins said that an increase in the rate of fare to 9 cents on March 1 may be looked for. Figures were 118,618,860 passengers for 1920 and 117,495,936 for 1919.

Mr. Culkins bases his conclusion on the assumption that there will be no reduction in the cost of materials of labor. Another contributing factor which may mean higher fares, he said, was a possible falling off in the number of passengers.

According to the franchise under which the company is operating an increase of only one-half cent can be made at any time, and this can only be done when receipts for the first two months of the preceding quarter have shown a deficit.

Receipts for December and January will not be submitted by the company until the beginning of February. If Mr. Culkins' prediction proves true that expenses of the company will not be reduced, the receipts for these months will show a deficit and another increase of one-half cent will go into effect, making the fare 9½ cents.

Transportation News Notes

Ten Cents in Atchison.—The City Council of Atchison, Kan., has authorized the Atchison Railway, Light & Power Company to charge a 10-cent fare on its city lines. The new rate is to stand until July 1, 1921, unless further extension is granted by the Council. The 7-cent fare went into effect a year ago.

Car Tickets as Gifts in San Diego.—Many residents of San Diego, Cal., were helped to solve the gift problem during the holidays by the San Diego Electric Railway. The 7½-cent fare tickets, good for ride through inner and outer zones and all transfer privileges, were put up for sale in neat little booklets containing forty tickets, with space on the cover for the name of the recipient and the donor. A large number of these practical gifts were reported sold.

Fare Schedule Continued in Milwaukee.—The rates of fare for the single fare and suburban areas at Milwaukee, Wis., as fixed by the Wisconsin Railroad Commission in its order of June 24, 1920, were to have expired on Dec. 31, 1920, but have been continued by the commission until further order. Before such an order is issued, it is said, another hearing will be held. The single-fare area schedule is 7 cents cash and eight tickets for 50 cents. The continuing order was issued on Dec. 29, 1920.

Higher Rates in Kingston.—The Public Service Commission, Second District, has authorized the Kingston (N. Y.) Consolidated Railway to put into effect on five days' notice a 7-cent cash fare with four tickets for 25 cents. This new rate will be effective for one year or until further orders of the commission. A 6-cent fare was put into effect on the Kingston lines in April, 1919. Several months ago the company petitioned the commission for authority to fix such a rate as it would find just and reasonable.

Commission Claims Power Over Rates. — The Arkansas Corporation Commission has announced that it has jurisdiction to pass upon the reasonableness of rates. It takes this stand notwithstanding the existence of a contract between the utility and the town in which it is operating, and the fact that the Supreme Court of the state has held that a contract between a town and a public utility company is valid as between the parties does not deprive the commission of its jurisdiction to pass upon the reasonableness of the rates fixed in the contract.

Seven-Cent Fare Continues in Lima.—A 7-cent fare will continue for six months after Feb. 1 on the Lima, Ohio, lines of the Ohio Electric Railway. A 7-cent cash fare went into effect on Sept. 3 and the expiration date was set for Feb. 1. The company recently applied for an extension on the ground that it had not profited sufficiently by the increased fare. The Council granted the extension. Mayor F. A. Burkhardt has announced that unless the railway takes steps to improve its service the city will consider a plan for municipal operation.

Eight Cents in Each Zone. — Zone fares on the interurban lines of the Houghton County Traction Company, Houghton, Mich., have been raised from 7 cents to 8 cents by authority of the State Public Utilities Commission. Tickets, each good for a ride in one zone, are being sold at the rate of five for 35 cents. Children between the ages of five and twelve years will be carried for 5 cents in each zone. They formerly paid the same rate as adults. The fare within the city limits of Houghton, Hancock and the other towns served by the railway remains at 5 cents.

Mr. Beeler's Plan Opposed.—The Safety Council at Kansas City, Mo., will launch, as one of its new year activities, a campaign for abandonment of the Beeler plan of loading and unloading street cars in the down town district. L. J. Smyth, director of the council, is reported to have said: "The Beeler plan of loading street cars midway between intersections is fundamentally wrong, so wrong it should be abandoned at once. First it requires pedestrians to cross the streets in the middle of blocks. Intersections are the only safe places to cross. Second, it permits motormen to smash across crowded intersections."

Restrictions on Camden Buses.—An ordinance has been passed by the City Council of Camden, N. J., regulating the operation of jitney buses through the streets of that city. Jitney operators in securing licenses in the future must designate the proposed route, which must be operated every trip. Each car must be equipped with a cash register and reports of receipts are to be turned over to the City Treasurer. Licenses will be granted only to those who have had at least six months' experience. License fees will cost from $100 to $250 according to passenger capacity. The question of jitney regulation in Camden has been pending now for several months.

Bulletin for Nashville Riders.—"Read As You Ride" is the title of a little folder issued by the Public Relations Department of the Nashville Railway & Light Company, Nashville, Tenn., for the use of its patrons while riding on the cars. This interesting little folder is issued every Friday by the railway and contains suggestions by the patrons of the cars for betterment of the service as well as complaints. The company asks the cooperation of its patrons in this manner and gives suggestions by which they themselves may help to increase the efficiency of the service in speed and convenience. A portion of the pamphlet is devoted to anecdotes under the title of "Smiles as You Ride" for the amusement of the passengers.

"Pay-Leave" Cars on Interurban.—The cars of the Union Traction Company of Indiana operating on the line between Indianapolis and Broad Ripple were converted into pay-as-you-leave cars on Jan. 1, when the through fare was raised to 10 cents. Passengers on both inbound and outbound trips are now required to enter by the front door, and to leave by the rear door, paying the conductor as they leave. The company received permission to charge 10 cents for rides between any point in Indianapolis and in Broad Ripple, and 5 cents for a ride within Indianapolis or Broad Ripple. Fifty-third Street is the dividing line from which the fare is computed. The Indianapolis city limit is ninety-four feet south of the center of Fifty-fourth Street, and the Broad Ripple corporation line is in the center of Fifty-fourth Street.

Wants More on Interurban.—A petition has been filed with the Indiana Public Service Commission by the Indiana Service Corporation, Fort Wayne, asking an increase in the present passenger rate of ½ cent a mile on its line between Fort Wayne, Lafayette and Bluffton, making the rate 3 cents a mile. The petition states that increased operating expenses have reduced the company's revenue to such an extent that an increase is absolutely necessary. Several interurban lines operating within the state, now have a 3-cent rate, while the Chicago, South Bend & Northern Indiana and the Winona Interurban Railway have also filed petitions for increased rates. The increase, if granted, would put the interurban lines on an equality with the steam roads, which have had a 3-cent rate for some time.

Reprisal Threatened in Fare Case.—Following the report of the committee of fifteen, which recommended to the City Commissioners of Covington, Ky., that the South Covington & Cincinnati Street Railway should be allowed to increase the rate of fare, citizens took a rising vote and decided that in the event that the increase is allowed they would walk. The fare on the Green Line is still 5 cents. The company has endeavored to show the citizens of the towns in northern Kentucky, through which the company operates, that it is now impossible to give the same service for 5 cents as it has done in the past. Refusal to allow the increase will necessitate the curtailment of service, Polk Laffoon, secretary of the company, said. The bone of contention on the part of the citizens of the northern Kentucky towns is that the railway itself has incurred no deficit, but that the deficit has been caused by subsidiaries of the corporation. The railway's financial troubles began several months ago. Last fall its trainmen demanded an increase in wages. The board of arbitration awarded the men a 60-cent scale.

Personal Mention

Mr. Rifenberick Resigns

Consulting Engineer Retires from Detroit United Railway to Enter Business for Himself

Robert B. Rifenberick has resigned as consulting engineer for the Detroit (Mich.) United Railway. Mr. Rifenberick was born in Cincinnati. In June, 1885, he was graduated from Miami University Scientific Training School. The following year, 1885-86, was spent in the university proper specializing in engineering. Mr. Rifenberick was taken into his father's office as a draftsman, but made it a point to change from one job to another with a view to getting a wide and varied experience.

During part of 1886-87, he was draftsman, levelman, transitman and finally in charge of a party on the railroad projected from Middletown, Ohio, to Louisville, Ky. The fall of 1887 to the spring of 1889 he spent as instrument man on the Duluth, South Shore & Atlantic Railroad construction in northern Michigan. After five years or more spent in engineering work on steam railroads, Mr. Rifenberick engaged for five years as engineer with the New Orleans Traction Company, constructing street railways in New Orleans. He also constructed by contract one of the smaller lines and parts of others. In 1898-1900 he was engaged first in charge of ballasting and relaying steel on the New Orleans & Northeastern Railroad, then as engineer in charge of construction, Cleveland & Eastern Electric Railway, Cleveland to Burton, and later as traction engineer for the city of Cleveland.

From the middle of 1902 to April 28, 1908, he was consulting engineer of the Cleveland Electric Railway. This was during the régime of Tom L. Johnson, Mayor of Cleveland. During this time he played an active part in sixty-one injunction suits in the Cleveland controversy, fifty-nine of which were won by his company.

After spending one year in private consulting practice with offices in Cleveland, Mr. Rifenberick accepted on Feb. 15, 1909, the position as consulting engineer with the Detroit United Railway, from which he has just resigned.

No definite plans for the future have as yet been formulated by Mr. Rifenberick. It is his intention, however, eventually to enter private practice on electric railway construction, operation and appraisal work.

P. F. McCall Promoted

Peter F. McCall, general storekeeper of the Chicago Elevated Railroads, has been appointed superintendent of materials and supplies of the Chicago, North Shore & Milwaukee Railroad. While retaining his position on the elevated system, Mr. McCall's duties have been expanded to include charge of certain work on the Chicago-Milwaukee interurban system. The department of materials and supplies is newly created and it will include the present purchasing department, which handles the purchase of all railway materials, supplies and foodstuffs; the storehouses for railway materials and commissary and supervision of all restaurants.

The purpose of this department will be to consolidate, co-ordinate and bring about the greatest economy and efficiency in the purchase, receipt, and distribution of all supplies, and properly to merchandise the sale of all foodstuffs and supplies sold to the public through the medium of restaurants, concessions and dining cars. The purchasing agent, storekeeper, and superintendent of dining car service of the North Shore Line will report to Mr. McCall. Mr. McCall has been with the elevated system for about ten years.

Van Horn Ely Heads Columbia Graphophone Company

Van Horn Ely, president of the American Railways, Philadelphia, Pa., has been elected president of the Columbia Graphophone Manufacturing Company, New York City, to succeed F. S. Whitten, who has been made chairman of the board of directors. Mr. Ely's connection with the phonograph company as active head will in no way affect his status with the American Railways or the other traction properties in which he is interested.

Mr. Ely was born in Lockport, N. Y., on July 28, 1866. He was graduated from the Lockport Academy in 1884 and from the Buffalo High School in 1885. Three years later he entered the real estate business as a member of the firm of Bell & Ely. He was appointed in 1899 assistant to the president of the International Railway, Buffalo, where he remained for six years. He then resigned to become head of the electric railway and lighting properties serving communities for seventy-five miles along the Ohio River between Pittsburgh and Beaver, Pa., and Wheeling, W. Va. Two years later he incorporated the National Properties Company, a holding company which has acquired public utilities in many cities of the East and Central West. In 1916 the National Properties Company acquired the American Railways, which owns and operates electric light and railway properties in a number of cities, including Wilmington, Del.; Chester, Scranton and Altoona, Pa.; Springfield and Dayton, Ohio; Joliet, Ill.; Huntington, W. Va., and Lynchburg and Roanoke, Va.

Henry Surguy Edits "Aera"

Henry Surguy, editor of *Aera* since the resignation of Harlow C. Clark some months ago, has been connected with activities of the American Electric Railway Association for more than a year, first in charge of publicity for the Committee of One Hundred and later as special contributor to *Aera*. He is particularly well informed on public relations matters and his articles along these lines in *Aera* have attracted unusual attention. Mr. Surguy has not had any direct training along engineering or electric railway managerial lines, but has a background of schooling in journalism and law that bespeaks for him ability quickly to grasp the essentials of electric railway economics, finance and operation.

Mr. Surguy was born in Columbus, Ohio, in 1886. He was educated in the public schools and high schools at Washington, D. C., and was graduated in 1910 from the National University Law School with the degree of LL.B. He practiced law in Fairfax, Va., and in Washington, D. C., in 1911 and 1912. Like Alfred Henry Lewis and other noted editors and writers, however, he foresook law in 1913 to enter journalism. His experience in newspaper work covers practically every position from reporter to editorial writer and staff correspondent. He has been with the Washington *Herald*, the Frederick (Md.) *Post*, New York *Herald*, Hot Springs *Telegraph*, the Richmond *Times-Dispatch*, and more recently has been city editor of the Washington *Herald*, news editor of that paper, and staff correspondent of the Washington Bureau of the United Press Association. Finally after service in 1917 with the United States Marine Corps in the Champagne Sector in France, he returned to New York to become staff correspondent of the New York *American*.

Chester M. Rowell, Commissioner

Governor Stephens of California recently announced that Harvey D. Loveland would be appointed to succeed himself as a member of the State Railroad Commission on Jan. 1 last and that Chester M. Rowell, Fresno, would be appointed to succeed E. O. Edgerton. Mr. Rowell will return at once to Washington to conclude his work as member of the United States Shipping Board, returning to California on Feb. 1 to assume his duty as Railroad Commissioner.

Mr. Rowell has been prominently identified with politics for a good many years in the State of California, and has for some years been the owner and publisher of one of the State's best known newspapers at Fresno.

Recently Mr. Rowell retired from the newspaper field by disposing of his newspaper holdings at Fresno, and it was reported that he was to affiliate himself with one of the San Francisco papers in the capacity as editor. His appointment to the commission disposes of this report.

Henry W. Blake Honored

Thirtieth "Milestone" Dinner Tendered to Senior Editor of the "Electric Railway Journal" by His Associates in the McGraw-Hill Company

Thirty years ago this month H. W. Blake, now senior editor of the ELECTRIC RAILWAY JOURNAL, joined the editorial staff of what was then the *Street Railway Journal*, a connection which he has held continuously and devotedly for thirty consecutive years. In appreciation of this unique editorial record, and as a milestone in his relations with the McGraw-Hill Company, his associates tendered him a dinner on Thursday evening, Jan. 6, at which many reminiscences of the *Street Railway Journal* and the ELECTRIC RAILWAY JOURNAL and Mr. Blake's editorial activities in connection therewith were reviewed.

AFTER graduation in 1886 from Yale as a civil engineer Mr. Blake took a course in electrical engineering in the Massachusetts Institute of Technology and then became connected with the Sprague Electric Railway & Motor Company, handling advertising and publicity work for the company. When Mr. Blake came to the JOURNAL in 1891 the argument between cable and electric advocates was at its height, not to mention such minor antagonists as the compressed air car, storage battery car, combustion engines, etc. Heavy electrification of any sort, such as the Baltimore tunnel work, was still four years away. In short, the young editor came to the *Street Railway Journal* during a period of unparalleled activity of invention, promotion, financing and construction.

With a technical knowledge rare in those days, a flair for seeking nothing but the facts in all the welter of contradictory claims and with a memory of marvelous tenacity, Henry W. Blake soon proved to be the one man for the job. In 1894 he became editor-in-chief, with results to the paper that speak for themselves. For as one of his long-time associates put it: "Mr. Blake has written his very life into the columns of the ELECTRIC RAILWAY JOURNAL, which stands as a monument to his thirty years' endeavor."

As an editor Henry W. Blake stands out pre-eminent for his sense of fairness, for his well-nigh universal knowledge of the field and for what editors among themselves call "balance"—the just apportionment and interpretation of news values.

HENRY W. BLAKE HAS GIVEN THIRTY YEARS OF SERVICE TO THE "ELECTRIC RAILWAY JOURNAL"

As an employer Henry W. Blake has always been noted for the quality best described by that fine English word "gentleman." To imagine any harshness toward a subordinate as coming from Mr. Blake is inconceivable.

As a man and a figure in the industry Henry W. Blake has made and held thousands of friends partly through the charm of his personality, partly through his willingness always to give to the inquirer of his truly amazing knowledge of mass transportation from the days of the horse-bus to the last word on its rubber-tired gas and electric successors and all that has been developed in between. The influence of such a man in such a position cannot be measured, but it can be and has been felt in every department and on almost every electric railway throughout the world.

As a tangible remembrance of the occasion, Mr. Blake's friends in the McGraw-Hill Company presented him with a de luxe edition of Gibbon's "Decline and Fall of the Roman Empire." His associates, however, felt that for once in his career Henry W. Blake should step into the limelight, so contrary to his modest nature. Hence the present remarks from those who have and will continue to work with and for him to keep the ELECTRIC RAILWAY JOURNAL in the front rank of technical journalism.

Trainmen Honor Colonel Kealy

One hundred and twenty-five officers and members of committees of the employees' organization of the Kansas City (Mo.) Railways gave a luncheon on Jan. 5 in honor of Col. P. J. Kealy, upon his retirement from the active supervisory management of the property. The luncheon was planned and arranged by committees of the employees, as a result of suggestions emanating from employees. Several officials of the company attended as invited guests. The event was notable as a tribute of personal regard and respect of all employees for Colonel Kealy, and as an expression, through these representatives, of the recognition by the body of employees, of the cordial spirit that has developed between company and men in the past few years, and of the efficient program of co-operation between company and employees for rendering public service.

R. L. Kimbrough, chairman of the Employees' Central Committee, presided. F. G. Buffe, continued as general manager under the receivership and joint author with Colonel Kealy of the employees' participation plan; D. L. Fennell, superintendent of transportation, who had a large part in the institution and operation of this plan; Warren Fisher, president of the Employees' Brotherhood, and other officers and employees spoke.

James Holt, committeeman from the shops at Ninth Street and Brighton Avenue, on the part of employees, presented a watch to Colonel Kealy, as evidence of their appreciation of his part in the building of the co-operative plan for service to the public by men and company and as a symbol of the personal popularity of Colonel Kealy.

Colonel Kealy, responding, said that the good judgment of the men in adopting the co-operative plan had been vindicated, for under it there had been great improvement of service to the public and material benefit to the employees. Colonel Kealy said:

> Participation of the employees in ownership of stock of the company will come eventually, as the virtues of the plan get results in improved conditions for the men, in better service, and larger earnings.
>
> While returns on the investment of the owners are a paramount consideration in the operation of a utility, such returns are not possible nor to be expected unless service to the public is efficient and the wages and conditions for employees are such as will enable them to live like good citizens. A company that cannot pay proper wages has no business to exist. It should quit as soon as possible. The scheme of co-operation under which we have been working together, employees and management, for two years, provides for the two important factors, proper wages and efficient service, upon which adequate revenue depends.

"Fred" Handshy Climbs Another Notch

Veteran Operator Made General Manager of Interurban Lines of the Illinois Traction System—Other Promotions

New Year's Day had in store a pleasant surprise for C. F. Handshy of Springfield, Ill. Mr. Handshy received a number of greetings on Jan. 1, but the one which gave him the most pleasure and which, incidentally, called forth many of the others, came from H. E. Chubbuck, vice-president executive of the Illinois Traction System. Mr. Chubbuck's "best wishes" took the form of a notice to Mr. Handshy that he had been promoted to general manager of interurban lines of the system. Mr. Handshy was not the only executive to receive this sort of message from Vice-President Chubbuck. A number of superintendents of city lines included in the McKinley group of properties learned that they too had been promoted, their titles in each case being changed to general manager.

THE general superintendents of city lines who have been made general managers are: J. E. Johnson, Danville Street Railway & Light Company; M. L. Harry, Decatur Railway & Light Company; D. W. Snyder, Bloomington & Normal Railway & Light Company; R. F. Carley, Galesburg Railway, Lighting & Power Company; E. A. Roehry, Cairo Railway & Light Company; F. E. Bell, St. Louis Electric Bridge Company, and Missouri properties; L. W. Hess, Northern Illinois Light & Traction Company; F. E. Fisher, Chicago, Ottawa & Peoria Railway, and E. H. Gray, Jacksonville Railway & Light Company.

"Fred" Handshy is one of those traction executives who have come into the electric railway field via the steam railroad route. He entered the employ of the Wabash Railroad in 1884 as a telegraph operator. Six years thereafter he became a train dispatcher for the same road, and in 1902 was promoted to the position of assistant chief dispatcher, with headquarters at Decatur, Ill. Two years later he succeeded to the position of chief dispatcher and later to that of trainmaster.

Mr. Handshy entered electric railway work in 1907 as general superintendent of transportation of interurban lines of the Illinois Traction System. Three years later he was promoted to general superintendent of interurban lines, and on June 1, 1913, he became assistant general manager. He served as president of the Illinois Electric Railway Association in 1917.

Mr. Handshy brought to the traction field a knowledge of operating methods which has undoubtedly been a great influence in the development of the electric lines of the country, particularly those of the Middle West. His initial engagement with the McKinley System came during its construction and formulative period.

During his connection with the system the idea of using trains made up of a motor car and trailer coaches was inaugurated. This idea was later developed into the successful use of motor cars to pull parlor cars, sleeping cars and express cars. The use of heavy locomotive-type express cars to pull trains made up of coaches, sleepers and express cars has proved to be very successful and the practice is still followed on the lines of the Illinois Traction System.

This was also among the first properties to develop the idea of trains operating over long distances. It has also been during Mr. Handshy's connection with the system that block signals have been installed. Another important development has been the hauling of freight on a scale comparable with steam road practice and the use of belt lines to shunt such traffic around cities through which the lines passed. In these respects also the Illinois Traction System was among the first to adopt the practice.

C. F. HANDSHY

Obituary

J. B. MacAfee, Railway Builder

John Blair MacAfee, organizer and formerly manager of many electric railway properties in the East and Central West, died in England on Jan. 11 following an operation. Mr. MacAfee had resided for a number of years in London, where he was active in banking and financial circles, being chairman of MacAfee & Company and of the British-American Continental Bank. He was also chairman of the finance committee of the American Chamber of Commerce in London and treasurer of the Royal Institute of Public Health.

Mr. MacAfee was born in St. John, New Brunswick, in 1861. Removing to Philadelphia at an early age, he attended the University of Pennsylvania and was admitted to the Philadelphia bar. He practiced law until 1892, when he took up engineering work. He subsequently organized the Raritan Construction Company and built several electric lines in New Jersey, including those of the New York & Philadelphia Traction Company and the Central New Jersey Traction Company, now a part of the system of the Public Service Railway, controlled by the Public Service Corporation of New Jersey.

Still later Mr. MacAfee became president of the American Engineering Company, which built the Newton Electric Railway and the Elmira & Seneca Lake Railway and the line between Kalamazoo and Battle Creek, Mich. He then served as vice-president and general manager of the Railways Company General. In 1899 he built the system of the Ohio River Electric Railway & Power Company and was identified with the building of the New Orleans & Pontchartrain Railway. Then followed the building of the Augusta-Aiken Railway, of which he later became president. He also served at one time or another as president of the Norfolk & Portsmouth Traction, the Pomeroy & Middleport, the Central & Kentucky Traction and the Blue Grass Traction Companies, and of the Lexington Railway. He retired from his active connection with these properties about ten years ago to go to England. At the time of his death he was a director of the Kentucky Traction & Terminal Company and of other public utility properties in the United States.

William Robinson, Ph. D., inventor of the Robinson radial truck which was used at one time extensively for electric cars, especially in New England, died in Brooklyn, N. Y., on Jan. 2. Dr. Robinson was an inventor and patentee in other fields than the electric railway, specializing on block signals. A number of his patents, covering the use of rail circuits, were acquired later by the Westinghouse interests. Dr. Robinson was eighty years old at the time of his death. During the time when Dr. Robinson's truck was on the market it was built by the Robinson Radial Truck Company of Boston.

Alva E. Moore, well known to many electric railway men in Indiana, died on Dec. 24 last in a hospital at Aberdeen, S. D., following an automobile accident. Mr. Moore was a traveling auditor for the Chicago, Milwaukee & St. Paul Railroad. He was formerly connected with the general offices of the Union Traction Company of Indiana, serving as an auditor and later as assistant division passenger and freight agent. He went to Chicago four years ago and became a traveling auditor for the Illinois Central Railroad, later taking employment with the Chicago, Milwaukee & St. Paul.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER.
SALESMAN AND PURCHASING AGENT
ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Stock Deliveries of Cartridge Fuses

Buying for Heater and Lighting Circuit Use Is Considerable, Though Only for Current Needs

Current buying of cartridge fuses by electric railways is not large judged by what manufacturers consider a strong demand. Nevertheless, the absolute needs of traction companies for fuses used with heaters, lighting circuits, etc., are sufficient to account for no inconsiderable volume of business, and orders of this "necessity" type are being placed right along. The fact that railways are not trying to accumulate considerable stocks of cartridge fuses for their future needs is no doubt influenced by the rapidity with which orders can be filled at present.

During much of 1920 fuse manufacturers were hampered by unfavorable production conditions and many of them fell far behind on orders. Until quite recently one of the large producers was running both day and night shifts. With the general falling off of demand and the improvement in production, however, these conditions have become gradually reversed. Some factories are now laying off numbers of workmen; back orders, while still existent in a few cases, are pretty well brought up to date, and in general shipments can be made from stock.

Prices have remained stationary for some time, and though no immediate reductions are seen the general price tendency, in view of the copper and insulation trend, would appear to be downward.

Business Is Fundamentally Sound

Ten reasons were given by Roger W. Babson when he appeared before the Chicago Association of Commerce on Jan. 7, as to why conditions in the business field are fundamentally sound. These are that the Federal Reserve System is successfully functioning; that 80 per cent of Liberty Bonds are still in the hands of the original purchasers; the effect of prohibition in releasing large sums of money for savings and investment, resulting in better living conditions; the development of national advertising and better resulting national distribution; the development of standardization in all lines of manufacture; the improvement in the elimination of seasonal fluctuations in business; the economic education of the public; the wonderful crops of the past year, which despite very much lower unit prices, have brought to the farmers almost as large a sum of money as they received for their crops the year before; our great merchant marine, and the lesson of the last election that radicalism cannot sway the country.

In discussing the troubles of the business world, Mr. Babson gave it as his opinion that the beginning of the end of a period of prosperity was marked when 51 per cent of the people turned from purposes of service, thrift and honest dealing, to selfishness and extravagance. Likewise, when 51 per cent turned from selfish interests to service, this marks the beginning of better times. It was his view that the bottom of business depression would be reached in a few months, and that while complete recovery might take two or three years, there would be a gradual process of improvement.

Quiet Market for Fenders and Wheel Guards

Buying of Repair Parts Is Normal—Good Deliveries—Safety Car Equipments Shipped from Stock

Buying of repair parts for car fenders and wheel guards by electric railways is proceeding in about normal volume, through orders come spasmodically and do not bulk very large. The market for complete equipments is rather quiet just now following the good sales that were made in the past year. Orders for car fenders and wheel guards are for the most part dependent upon the buying of new cars and right now the demand is not very heavy. Manufacturers report that during the last year or so they have experienced a fair demand for equipments on behalf of old cars that were being fitted with up-to-date safety appliances.

Conditions of supply in this market are excellent as labor and raw material are now favorable factors. Fenders and guards for safety cars, being practically a standard article, can be shipped from stock and a good reserve supply of repair parts sufficient to care for all needs promptly is also carried. Equipments for other cars, however, can not be shipped from stock as their manufacture is according to specification and the quickness of delivery varies. In general it can be said, however, that shipments are good. No price change has come about yet.

Manufacturers are optimistic over the volume of business which they think should develop during the present year, for with improving financial conditions the necessary rehabilitation of rolling stock, it is hoped, will result in good buying of fenders and wheel guards by car builders.

Several Months Required to Get Insulators

Demand for High-Tension Porcelain Material Keeps Factories Busy Although Present Buying Is Slow

Deliveries of porcelain high-tension insulators, though improving, are still long, despite the fact that comparatively few new orders are coming in just now. Manufacturers have enough old business on the books, however, to carry them well along through the first half of the year. It is this circumstance, coupled with production difficulties, that has caused new orders to stand scant chance of being filled promptly. One of the difficulties mentioned has been the short supply of natural gas upon which some manufacturers depend for firing their insulators. Another has been raw material, though recently the latter has almost ceased to be a factor affecting production adversely. Production, as a matter of fact, in several cases is increasing and the capacity of some plants is also being enlarged.

FOREIGN MARKET PROMISING

Although manufacturers are warning their customers to enter the market now if they expect to make new power extensions during 1921, the prospect of long insulator deliveries does not seem to have hastened buying. In fact, demand from home and abroad has been dropping off and is light at present. Good prospects for insulator buying are said to exist in Italy, Switzerland, Japan and Scandinavia. Just when the large need for insulators that is known to exist in this country and abroad will result in orders being placed, however, is a question. Prevailing exchange rates, on the one hand, and tightness of money, on the other, have a deterrent effect on buying. Expectations of lower prices may also be a consideration, though producers offer little hope of prices changing for some time. Wages remain unchanged at insulator plants, it is stated, and no employees have been laid off, so far as can be learned. The raw material, being mostly a complete product of nature, is not subject to great fluctuation, and costs are no lower there.

Deliveries, generally speaking, probably average three to four months, though extremes of two to six months, and even seven occasionally, are quoted, depending upon the size and type of insulator and the manufacturer. In some cases suspension insulators are worse off than pin types as regards supply, and in others better. Surplus stocks, of course, do not exist anywhere.

Pole Material Prices Lower

Crossarms, Pins and Hardware Reduced —Stocks Ample to Care for Light Demand

Buying of wood poles, crossarms, pins and pole hardware is in general light, but with the comparatively open winter to date it is hoped that central stations and railways will consider their line needs earlier this year. The exception to light buying is found in the Atlanta district where there is a good movement of this material.

Stocks in distributers' yards are good, for the most part, but there is reported only enough line hardware to care for the present demands. There seems to be no excess of it. Wood materials can be had in the East on deliveries of about two weeks. Last year stocks were good at the mills and cutting yards but very poor in distributers' yards. In the San Francisco territory stocks of crossarms are better than for several years, while decreasing business by local lumber companies has resulted in a crop of vigorous competitors for crossarm business.

Six-pin, 6 ft. x 3¾ in. x 4¾ in., Rainier fir crossarms in New York sections in 3,000 to 5,000 linear-foot quantities are quoted $114.68 per 100 arms, price reductions of about 10 per cent having been made early in December. Yellow pine arms, same conditions, are $95.98 per 100 arms. In the southeast, standard fir arms, two-pin, 4-ft., lots of 1,000 linear feet and over, are 62 cents each; four-pin, 4-ft., 83 cents. N. E. L. A. fir arms, two-pin, 3-ft., 93 cents; 4-pin, 5-ft. 7-in., $1.41 each.

Locust pins, 1½ in. x 9-in. in lots of 5,000 are quoted in New York at $38.75 per 1,000, and in Atlanta $42. The 1¼-in. x 8-in. pins are $27.15 in New York, $25 in Atlanta and $30 in St. Louis.

Hot galvanized crossarm braces, $1\frac{7}{32}$ in. x $\frac{7}{32}$ in. x 24-in. are quoted in New York at $120 per 1,000 in 500 lots; in Chicago they are quoted $155.03 in 500 lots and $137.80 in larger lots. Crossarm bolts, ⅝-in. x 10-in., in New York bring $10.92 per 100 for 500 bolts and in Chicago $13.71 per 100 for 500 bolts and $12.19 for larger quantities.

As far as has been learned there has been no price decrease applied to wood poles.

Window Glass Prices Firm

Were it not for the slump in the building industry the window glass market during 1920 would have presented a famine aspect. As it was, it was not until recently that manufacturers were anywhere near caught up on back orders. One reason for the scarcity was the shutdown of European factories during the war and the curtailment of domestic production during the same period. Following the dangerously low point to which window glass stocks became reduced came shortages of labor, raw material and transportation tie-ups. As a result several producing interests practically were out of the market for a long time. Double-strength glass which is used in car windows was particularly scarce.

Recently demand has lessened and reasonable shipments can be made from stock up to three weeks' time. No likelihood of lower prices very soon is held out, however, especially in view of current demands for higher wages by independent workers and low gas fuel supply.

Senator Calder Seeks to Regulate Coal Industry

Production, Ownership, Sale and Distribution of Coal Charged with Public Interest and Use

Senator Calder of New York, chairman of the United States Senate's committee on reconstruction, which has just concluded an investigation into the bituminous-coal situation, on Wednesday of this week introduced a bill which seeks to regulate the coal industry of the United States and declares the ownership, production, sale and distribution of coal throughout the country to be "charged with public interest and use."

By the provisions of this bill coal operators and others engaged in the coal business must give to the government at stated intervals complete reports as to their business activities. It gives to the President of the United States in any period of emergency the right to fix maximum prices, to direct production and distribution and, if need be, to engage in the sale of coal to the people.

In commenting upon his bill Senator Calder accused the coal operators of engaging in biased and self-serving methods of publicity and of concealing the facts of the coal situation from the public. Profiteering, he asserted, had been proved and admitted, but a controversy exists as to its extent and its promoters and beneficiaries. The bill aims to make such practices impossible. It does not set up any new governmental machinery, but utilizes the experienced agencies in existence, chiefly the Federal Trade Commission, the Interstate Commerce Commission and the Geological Survey.

Rolling Stock

Alabama Power Company, Birmingham, Ala., has on order two safety cars for its Gadsden division and is also in the market for two closed, double-truck trailers.

San Diego (Cal.) Electric Railway Company received 25 new Birney safety cars on Dec. 19 for operation on its lines where travel is light. The new cars are 28 ft. in length, weigh about 8 tons and seat thirty-two passengers. The company will continue to operate the large two-man cars on the lines where traffic is heavy.

Recent Incorporations

Shore Line Electric Railway, Norwich, Conn.—A petition requesting the Legislature to grant a new charter to new owners of the former property of the Shore Line Electric Railway has been filed with the Secretary of State. It is stated that Mr. Levinson bought the New Haven-Chester line and property of the Shore Line and will start operations with a capital stock of $600,000.

Woodbridge Street Railway, Woodbridge, Conn.—The Woodbridge Street Railway will apply to the Connecticut Legislature some time in January for a charter to build a railway which will connect with the Connecticut Company's Whalley Avenue line at Pond Lily near New Haven and will run out into Woodbridge. The new line will be about 1½ miles in length. The incorporators are: Adam Ziegler, Michael J. Quinn and William B. Turley, all of whom are interested in the Woodbridge Trap Rock Company. Judge Burpee of the Superior Court has notified all people interested in the petition to appear before the General Assembly and give their opinions.

Track and Roadway

Alabama Power Company, Gadsden, Ala.—The Alabama Power Company has authorized the expenditure of $100,000 in improvements in its Gadsden division. This includes the replacing of several miles of small rail with larger relay rail and the rebuilding of certain parts of the overhead system where replacement is needed.

St. Petersburg-Tampa Railway, St. Petersburg, Fla.—R. E. Ludwig, director of public utilities for the city, has asked the City Commission to issue short-term bonds for $65,000 for two extensions of the municipal street railway system—the First Avenue loop and the Ninth Street extension from Central to Seventh Avenue, the total to be approximately 1 mile of track. The commission has instructed the city attorney to call an election for the bonds. Several citizens have come forward with pledges of from $1,000 to $5,000 and indications are the entire issue will be subscribed before it is offered.

Evansville, Ind.—There is agitation for a union traction station at Evansville, Ind. At the present time there are two traction stations in that city, one on Fifth Street and the other at the corner of Locust and Second Streets. The stations are about two blocks apart. The Fifth Street station is used by the Evansville & Boonville line and the Evansville, Suburban & Newburg road, while the station at the corner of Locust and Second Streets is used by the Ohio Valley Railway, the Rockport and Grandview line, the Mt. Vernon line and the Evansville & Henderson line.

Power Houses, Shops and Buildings

Cincinnati (Ohio) Traction Company.—The Cincinnati Tracton Company plans to purchase part of the power it requires for operation of its lines from the Union Gas & Electric Company. Automatic substations are now being planned by the company. W. C. Culkins, director of Cincinnati's street railways, favors the purchase plan and believes it will mean a considerable saving to the railway.

Hagerstown & Frederick Railway, Frederick, Md.—Electricity generated by water power was switched in over the high tension wires of the Hagerstown & Frederick Railway on Dec. 18 from the plant of the Northern Virginia Power Company at Millville, part of the Hagerstown and Frederick Railway's power system. Fully $250,000 has been expended on the recently acquired Northern Virginia Power Company by the interests backing the Hagerstown & Frederick Railway.

Trade Notes

Léon Chapuis, 36 Boulevard Magenta, Paris, France, distributer of electric railway supplies, would like to secure catalogs of American manufacturers of supplies of all sorts in this field.

The Pawling & Harnischfeger Company, Milwaukee, Wis., has increased its authorized capital stock from $1,000,000 to $3,000,000. This new issue is to cover an extensive plant development. The company manufactures electrically driven traveling cranes.

E. W. Charland, Tilton, N. H., manufacturer of mica insulating materials, is enlarging his plant and installing new machinery to cut and to grind mica. When improvements are completed 1,000 lb. of mica washers will be cut per day.

The Whiting Foundry Equipment Company, Harvey, Ill., announces that it has changed its name to Whiting Corporation and increased its authorized capital stock from $700,000 to $3,000,000. The company remains under the same management and will manufacture cranes, foundry equipment and railway specialties, as heretofore.

The American Chamber of Commerce in London, 8 Waterloo Place, Pall Mall, London, S. W. 1, England, has issued a year book of this chamber for 1920, in which are listed the names, addresses and business classification of more than 1,000 Americans and British firms, including electrical manufacturers, interested in developing business between the two countries.

The Conveyors' Corporation of America, Chicago, announces the appointment of the Hallidie Machinery Company, L. C. Smith Building, Seattle, Wash., as its representative in Washington and Oregon. The Hallidie company is twenty years old. Philip Rowe is president, W. S. Dyson vice-president, Archie McLean secretary, and George Henderson treasurer.

J. A. Robinson has been appointed Western sales agent of the Consolidated Car-Heating Company with headquarters at 1814 Fisher Building, Chicago. Mr. Robinson, who succeeds C. A. Eggert, recently resigned, was previously with General Electric Company and for the past several years has been in the mechanical department of Consolidated Car Heating Company.

Falls Rivet Company, Kent, Ohio, has just purchased from the Ohio Wire Goods Manufacturing Company, Akron, Ohio, all the machinery, patents and patterns relating to the manufacturing of cotter pins and flat spring keys. The machinery has been moved from Akron to Kent and is now in operation. The Ohio Wire Goods Company will discontinue the manufacturing of these articles and the Falls Rivet Company will add to its product of rivets, bolts and nuts for the railway trade.

Manistee Iron Works Company, Manistee, Mich., manufacturers of Roturbo centrifugal pumps, vacuum pumps, rotary jet condensers, etc., has established a Pacific Coast office in the Rialto Building, San Francisco, Cal., in charge of L. M. Page, formerly salesmanager of the company for the past five years. The company expects to open branches also at Los Angeles, Portland, Ore., and Seattle, Wash., which will be under the supervision of Mr. Page.

The Transit Equipment Company, New York City, dealer in used railway equipment, through its president, R. W. Marshall, has taken over three acres of ground from the Batavia Car Works, Inc., Batavia, N. Y., of which company Mr. Marshall is vice-president and general manager. The company will erect a two-story brick building on the ground, 100 ft. x 150 ft., which will be used for rebuilding used motors, controllers, etc.

Fowle & Cravath, electrical and mechanical engineers, Monadnock Bldg., Chicago, Ill., has discontinued business owing to the withdrawal of James R. Cravath from the firm. Mr. Cravath moves to California because of the ill health of one of his family, but Frank F. Fowle announces that the new firm of Frank F. Fowle & Company will continue business at the above address, covering the same field as heretofore. The services of Mr. Cravath will still be retained in an advisory capacity.

The Star Brass Works, 3114 Carroll Avenue, Chicago, manufacturer of cooling systems, painting and spraying machinery, announces that on and after Jan. 1, 1921, the company name will be changed to Binks Spray Equipment Company to conform more nearly with the nature of the products manufactured. Announcement is also made of the completion of a new plant and office extension on the west wing of the old plant, in which provision is made for new salesrooms, testing laboratories and increased manufacturing facilities on the first floor, with new offices and drafting rooms on the second floor. The new addition was necessary by reason of the rapid expansion of the business.

The Standard Underground Cable Company, Pittsburgh, Pa., announces that Richard G. Harris succeeds John P. Bell as Pacific Coast manager. Mr. Bell will hereafter devote his time to the growing demands of his export and import business. Mr. Harris has been connected with the organization since 1909 and for the past eight years has been manager of the Montreal office territory of the Standard Underground Cable Company of Canada, Ltd. Vinton Smith, who has been with the San Francisco office staff for several years, has been appointed assistant Pacific Coast manager. W. G. Stearns, also for many years with the company on the Pacific Coast, has been appointed special sales agent.

New Advertising Literature

Recorders.—The Foxboro Company, Inc., Foxboro, Mass., is distributing bulletin No. 114, covering its Foxboro-Heath CO_2 recorder.

Safety Disconnecting Hangers.—The Thompson Electric Company, 226 St. Clair Avenue, N. E., Cleveland, Ohio, has issued catalog B-19, describing the new underslung feature of its safety disconnecting hanger.

Electric Arc Welding.—The U. S. Light & Heat Corporation, Niagara Falls, N. Y., has issued bulletin 700, entitled "Electric Arc Welding," in which it describes "USL" arc-welding machinery.

Coal Combustion.—"Automatic Combustion Control," descriptive of the Gray system of automatic control, is being issued by the Automatic Fuel Saving Company, 549 West Washington Boulevard, Chicago.

Testing Equipment.—The Delta-Star Electric Company, 2433-2453 Fulton Street, Chicago, is distributing a leaflet describing its 40,000-lb. testing equipment for mechanically testing insulators, bus supports and switches which will be subject to heavy mechanical stress.

Headlight Projectors and Reflectors.—Crouse - Hinds Company, Syracuse, N. Y., has issued bulletin No. 304-A, effective Dec. 15, 1920, a sixteen-page, illustrated booklet, which lists Imperial Floodlight Projectors and Imperial Reflectors developed since the publication of bulletin No. 304, which is still in effect.

General Electric Company: Bulletin on "Automatic Station Control Equipment," No. 47,730. This is an illustrated discussion on the whole subject of automatic control. It contains a partial list of automatic stations installed by the company and also a bibliography of this subject from 1913 to date.

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Is the most Efficient
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One Man Safety Cars

"The Peacock Staffless"

It is ***quick*** in ***application*** and ***powerful*** in ***operation.***

With it your trainmen can make a

Quick, Easy, Graduated Stop and Release

On grades it is quite as necessary to make a GRADUATED RELEASE, as it is desirable to make a SURE STOP.

This can be done with the

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with greater efficiency than with any other brake.

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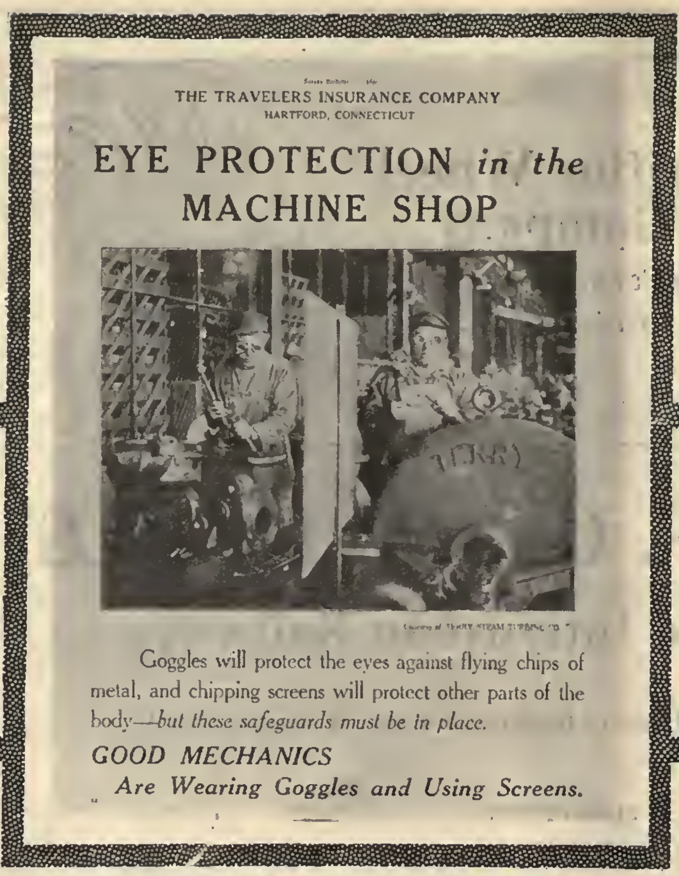

Safety Bulletin 169

THE TRAVELERS INSURANCE COMPANY
HARTFORD, CONNECTICUT

EYE PROTECTION *in the* MACHINE SHOP

Courtesy of TERRY STEAM TURBINE CO.

Goggles will protect the eyes against flying chips of metal, and chipping screens will protect other parts of the body—*but these safeguards must be in place.*

GOOD MECHANICS
Are Wearing Goggles and Using Screens.

Progressive from Drawing Board to Shipping Room

Travelers' Tower 513 feet high. The tallest building in New England.

A GOOD example of Terry progressiveness is shown in the above Safety Bulletin, which was issued by The Travelers Insurance Co. It shows one more way in which the Terry is setting the standard of good workmanship

This is typical of the spirit existing in every department, from the drafting room to the shipping room, in striving for safer and more efficient methods of producing a safer and more efficient steam turbine.

T-728

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in U.S.A. also in Important
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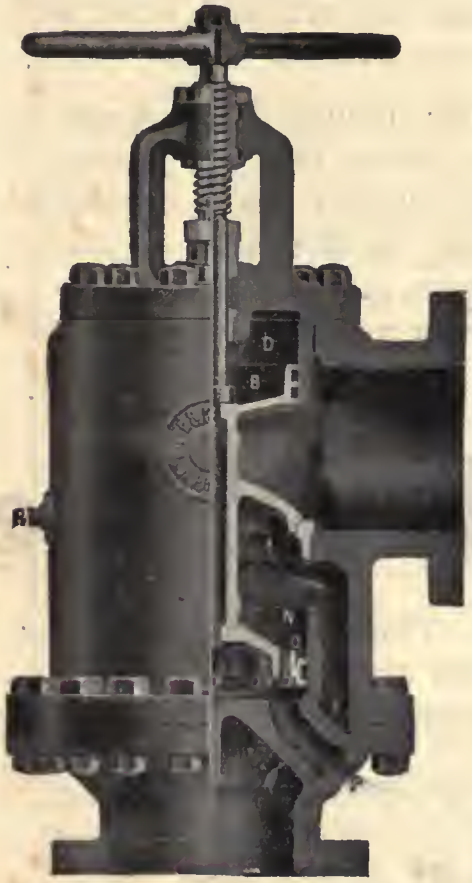

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The valves close automatically whenever a slight pressure drop takes place in the boilers to which they are connected and cannot open again until the pressure again rises to slightly above that on the main header.

They cannot be opened by hand and therefore give full protection to men working inside of cold boilers.

In case a steam pipe fails in any part of the plant—the steam flow from every boiler is instantly cut off which will positively prevent a disastrous pipe explosion.

Any of the valves may be closed by hand or by steam or electricity from convenient points in the plant.

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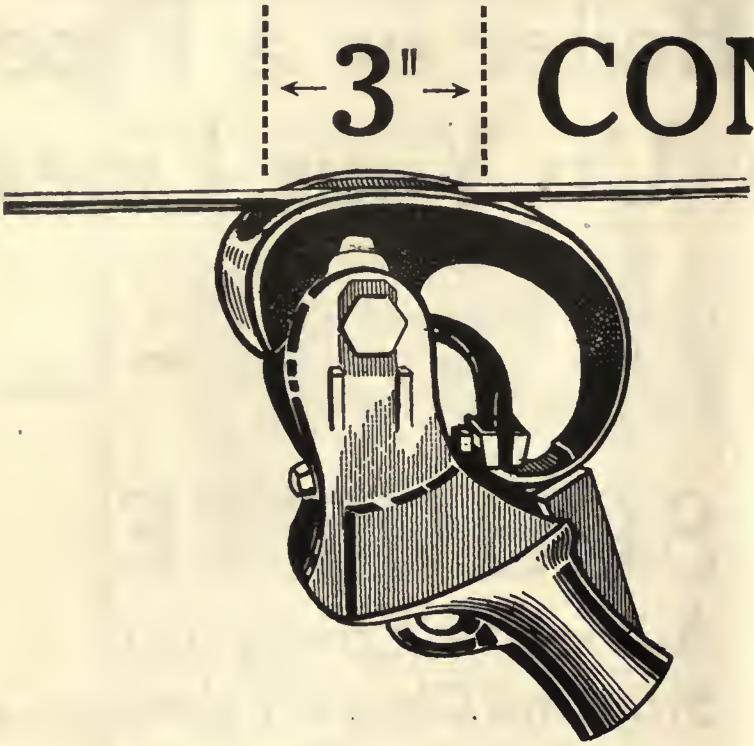

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IN all current collecting devices the more contact you have the less friction exists owing to the tension being distributed over a greater surface.

Miller Trolley Shoe operation proves that the greater the contact surface more power is delivered to the motors, giving greater capacity for overloads.

The Miller Trolley Shoe

has a contact on the wire of 3 inches. This contact is permanent. The Shoe follows each little unevenness in the wire. It does not jump and eliminates all sparking.

Miller Trolley Shoes have solved many problems that were the outcome of low voltage.

We stand ready at all times to show you on your own lines just what an advantage can be obtained by equipping your cars with the Miller Trolley Shoe.

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In Hindustani anything large is called *burra*.

Buddha's Tooth, a whale of a molar, is the object of unbounded reverence with more than four hundred million true believers. They have it installed in a temple, called the Temple of the Tooth, where thousands come every year to offer gifts of gold and jewels.

Many Central Station Operators here in America do an equally foolish stunt when they offer their hard-earned gold in exchange for ordinary carbon brushes. Then they wonder why their brush troubles continue!

Morganite engineers are squelchers of brush trouble because they first find out what operating conditions are *causing* trouble; then a brush is *specifically* designed to *satisfy* those conditions.

Prove it at our risk.

Morganite Brush Co., Inc.

Main Office and Factory: 519 West 38th Street, New York

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Pins—Bushings— Manganese Brake Heads

It's an awfully disagreeable job fussing around the brake rigging in winter.

Yes, even in a warm pit it isn't so pleasant to have melting snow and ice trickle down one's back. You can hardly blame the pitmen for getting from under before they're really through.

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Once you've put in a 100% outfit of Boyerized Pines and Bushings, Manganese Brake Heads and other of our long wear specialties your men won't have to bother looking for danger spots this winter, next winter and for more than one winter after that.

Boyerized Brake Hangers.

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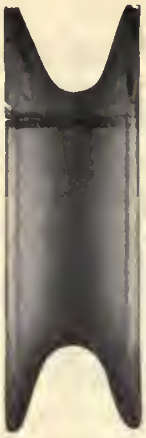

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Speed and Safety

will result from the constant use of Bayonet Equipment. Renewals made instantly.

Bayonet Special Trolley Wheels

are made from the highest grade metal and are hand turned, insuring greatest accuracy and balance. Reputation was gained by competitive tests.

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are the only trolley harps with which you can change from wheel to sleet cutter or to a new wheel in ten seconds. No tools required on top of the car. Inspections, repairs, adjustments and lubricating done at work bench later on when no schedules are being held up.

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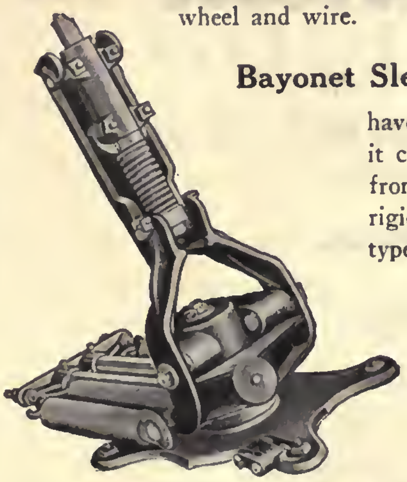
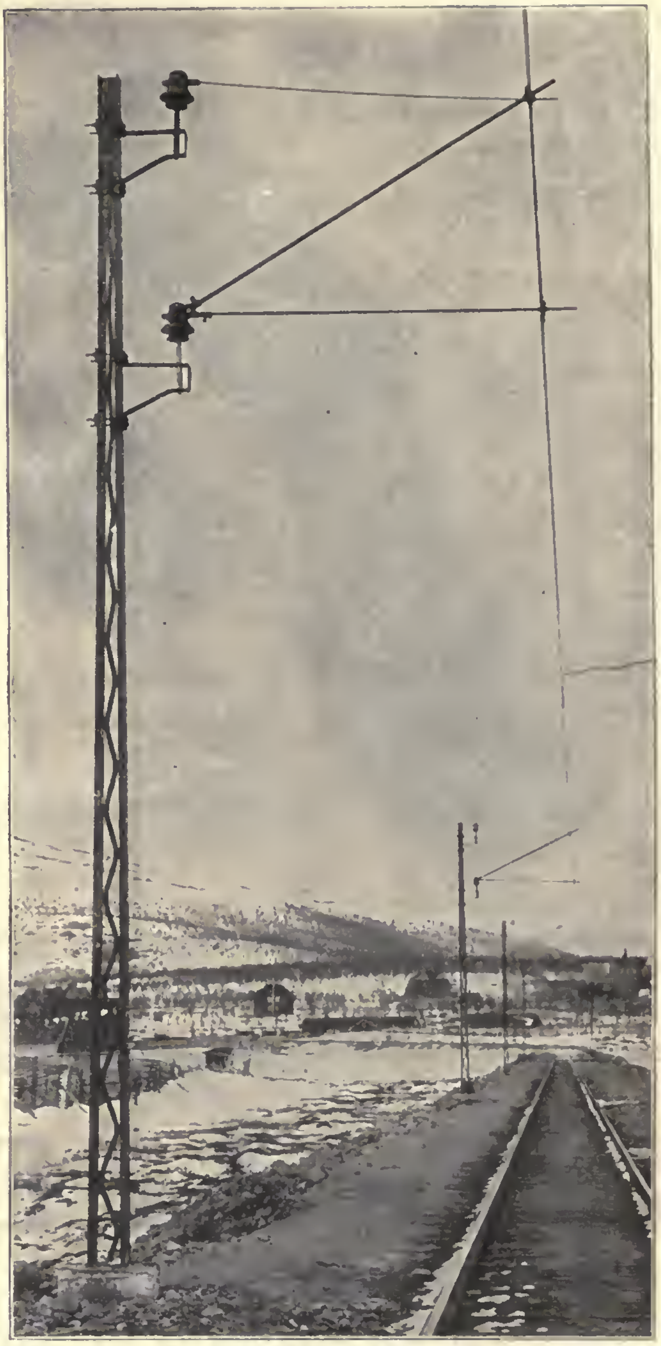


Bayonet Trolley Harp Co.

Springfield, Ohio



Bates One-Piece Steel Poles in Lapland, Sweden

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Bates Expanded Steel Truss Co.

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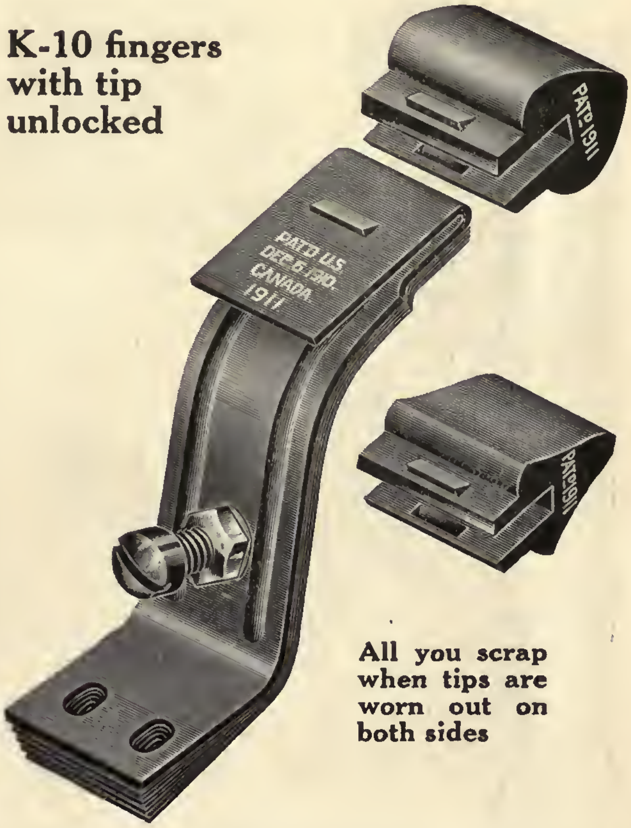

All you scrap when tips are worn out on both sides

Never Make a Big Repair When a Little One Will Do

You would think it the height of folly to scrap a controller because a finger had worn out, wouldn't you?

Then why scrap a controller finger simply because the tip has worn out? The principle is the same. Triggerlock fingers are designed to eliminate just that waste of material, money, and shop time necessary for the installation of new fingers.

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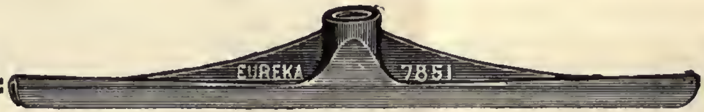

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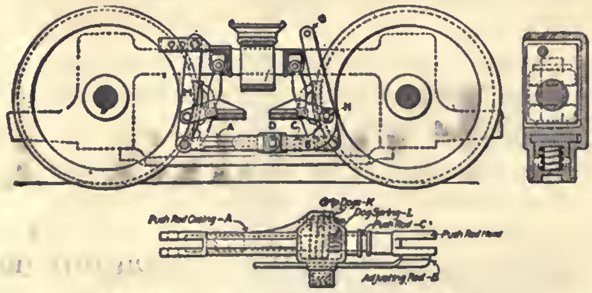

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Their use means SAFETY at all times in braking. A predetermined piston travel is always maintained. And they are economical. All manual adjustment of brakes is done away with, less power consumed in car operation and a great saving in the wear and tear of car equipment is effected.

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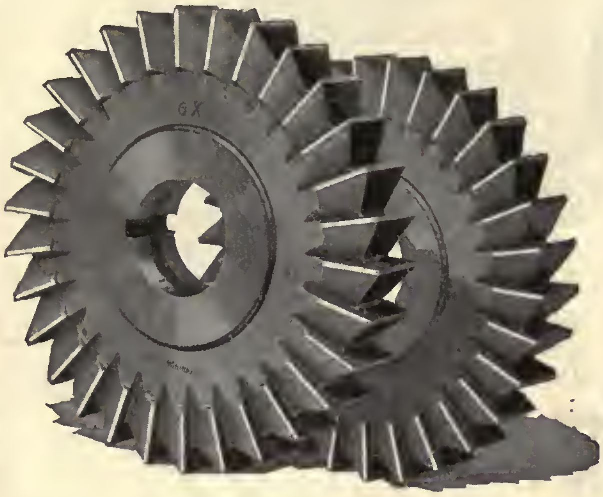

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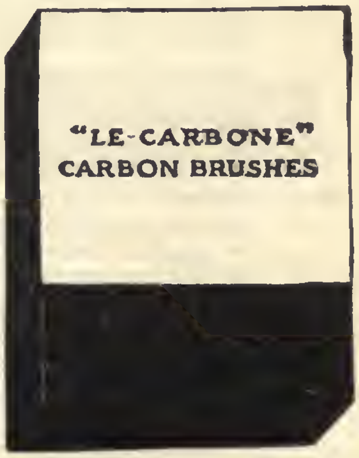

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BP Helical Gearing is guaranteed to give four times the life of untreated gears, and they practically eliminate the noise and vibration which is so destructive to other parts of the equipment.

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Are Safe

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Because of bad light or severe weather conditions a lot of human adjustment of brakeshoe wear is largely perfunctory.

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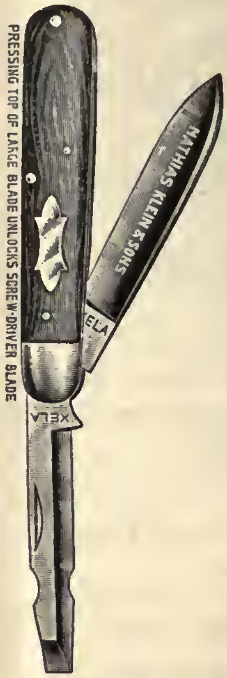
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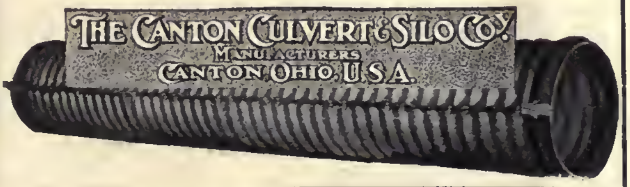
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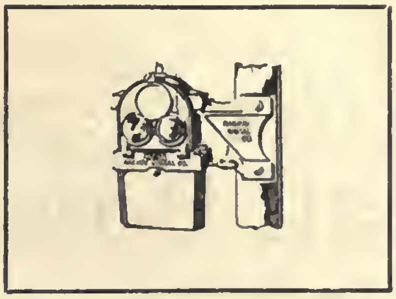

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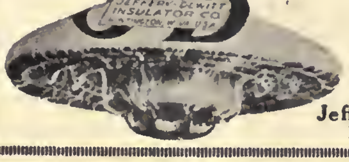

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A necessity for turbine protection, engine cylinder economy and utilization of superheat for all its benefits

Power Specialty Company Boston Chicago Philadelphia San Francisco Pittsburgh London, Eng. **111 Broadway, New York**

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Automatic Safety and Automatic Return Switch Stands for Passing Sidings. Tee Rail Special Work for Interurban Lines and Private Rights of Way. Manganese Construction a Specialty.

Ramapo Iron Works
HILLBURN, NEW YORK
Plants at Hillburn, N.Y. and Niagara Falls, N.Y. New York Office, 30 Church Street

PLAN A SAFE NEW YEAR

By renewing your efforts to reduce accidents and protect the health of your workmen. This should be done not only from a standpoint of humanity, but also to increase your profits through reduced compensation, continuous working time and increased efficiency.

LaFrance Safety Devices for Every Industry are the most logical means of accomplishing this

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Against every eye hazard ranging from flying chips and rivet heads to dust and irritating fumes and gases, also harmful lights and heats.

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Cabinets, Supplies, and Complete Outfits.

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Clothing, hoods, leggings, and gloves of asbestos and other similar material.

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Over a hundred stock wordings for inducing workmen to be careful and warning them of unsafe places and practices.

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From all kinds of dusts, fumes and poisonous gases. Every type of protection is represented in the LaFrance Line.

Our Safety Catalogue describes this line in full. It should be in every executive office in every plant. Write our nearest branch office for it today.

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For strength, service and dependability use drop-forgings. And if you do use drop-forgings specify WILLIAMS' SUPERIOR DROP-FORGINGS.

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STREET RAILWAY PAINTS and VARNISHES

Specialists in Insulating Varnishes

Consult Railway Sales Dept. for Special Service

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Webbings and Tapes made from the best raw materials—made with the most up-to-date machinery and most reasonably priced. That's what you get in Hope Products.

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When an advertiser sells equipment for over $4,000.00 through "Searchlight" advertising that cost $12.00, we think "Searchlight" is at least entitled to "favorable mention."

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615

Electric Insulation

INSULATING VARNISHES
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INSULATION *for apparatus subject to*
Severe vibration,
Oil and moisture,
Acid and alkali fumes,
High external heat,
Dust and grit.

A research laboratory under the direction of competent Chemists and Engineers is maintained by the Company. Any operating condition can be duplicated in the Laboratory and the "guess factor" eliminated.

Information covering varnishes suitable for any service together with most recent methods of application and insulating equipment furnished without fee or obligation.

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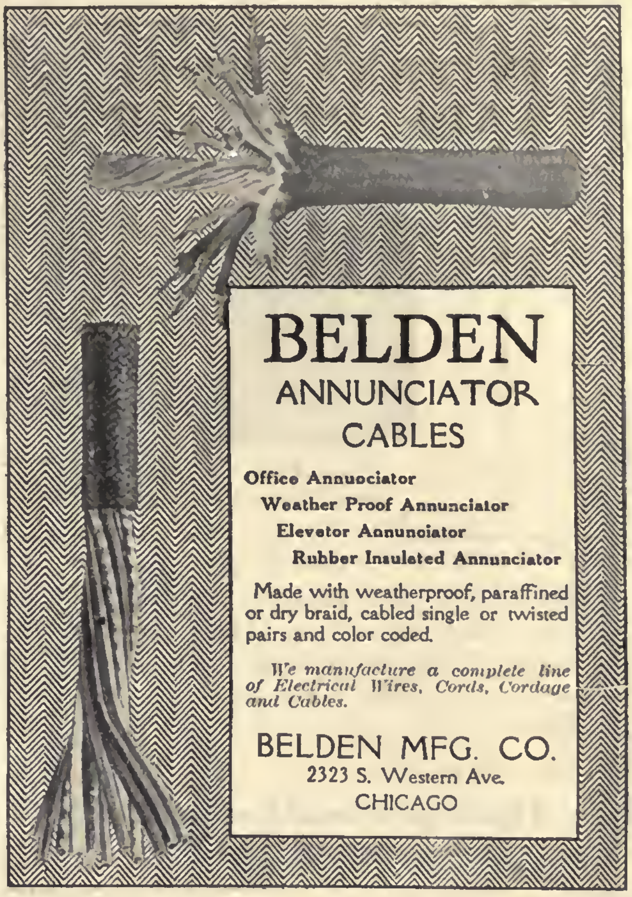

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Made with weatherproof, paraffined or dry braid, cabled single or twisted pairs and color coded.

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(Reg. U. S. Patent Office)

For Railway Armature and Field Coils

Chinalak Varnishes both Black and Clear are made with a base of China Wood Oil. This remarkable oil is superior in water resisting properties to any oil heretofore used in the making of varnishes. CHINALAK varnishes are "long" in oil, giving them the maximum of elasticity yet they may be dried in 6 to 8 hours at 100 to 110° C. The film is tough and pliable, does not become brittle with age and is oil and waterproof.

We have manufactured Insulating Varnishes and Compounds exclusively for the past ten years and our guarantee of quality goes with every shipment.

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The Insulation Specialists
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PERFECT
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INSULATOR

The same standard is also maintained in Empire, Linotape, Kablak and Mico.

They are well known in the Railway Shops because of their durability, high resistivity and low cost.

Why not become familiar with them in your shops? They will merit the acquaintance

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International Fare Registers. Single registers, round and square; double registers, duplex counters, car fittings, foot-operating devices for single and double registers. Exclusive selling agents for Heeren enamel cap and coat badges.

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For nearly 15 years American Railways have standardized on

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Because—

their tool steel dies last the longest.

Their finely tempered springs never break.

Their workmanship has always measured up to an ideal.

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Ask any railway employee who has used

"AMERICAN BRAND"
Punches, Buttons and Badges

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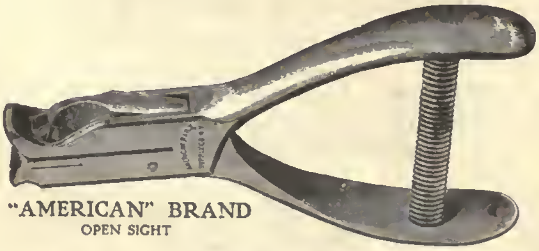

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OPEN SIGHT

AMERICAN RAILWAY SUPPLY CO.
134-136 CHARLES STREET NEW YORK

WE CAN CUT YOUR COST OF HEATING CURRENT

Write for THERMOSTATIC CONTROL INFORMATION

GOLD

- ELECTRIC HEATERS Cut Installation and Maintenance Charge.
- VENTILATORS Also Ventilate in Stormy Weather.
- THERMOSTATS Save Current.
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LET US FIGURE ON YOUR NEXT REQUIREMENTS
Gold Car Heating & Lighting Co., 17 Battery Pl., New York

The CLEVELAND is the practical Fare Box for the One-Man Car. Let us tell you why.

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Let us demonstrate to you how we can heat and ventilate your cars at the lowest possible cost

The Cooper Heater Company
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ELECTRIC RAILWAY JOURNAL

Think "SEARCHLIGHT" First

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ADD 5 WORDS for box number in undisplayed ads if replies are to any of our offices. There is no extra charge for forwarding replies.

DISCOUNT OF 10% if one payment is made in advance for 4 consecutive insertions of undisplayed ad.

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RATE PER INCH for ads in display space:

1 to 3 in., $4.50 an in.	15 to 29 in., $3.90 an in.
4 to 7 in., $4.30 an in.	30 to 49 in., $3.80 an in.
8 to 14 in., $4.10 an in.	50 to 09 in., $3.70 an in.

POSITIONS VACANT

EMPLOYMENT

POSITIONS WANTED

POSITIONS VACANT

EXPERIENCED timetable man wanted to analyze traffic and make schedules for short headway, multi-terminal Eastern road. State in first letter age, family, education, experience and salary wanted. P-824, Elec. Ry. Journ.

MASTER mechanic wanted for Middle West on a division operating 40 interurbans on 600-1,200 volts. P-787, Elec. Railway Journal, Leader-News Bldg., Chicago.

TRAIN dispatcher on electric line wanted: Second trick, hours 2 p.m. to 11 p.m. Salary $190 per month. System operates about 60 miles of street and interurban railway in a rapidly growing community. Apply to Gary Street Railway Co., 567 Broadway, Gary, Indiana.

POSITIONS WANTED

ENGINEER executive desires change; technical graduate, age 39; 18 years' public utility experience, all branches. Can secure co-operation of employees and deal successfully with public PW-821, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

POSITION wanted by experienced armature winder, car wireman, general repair man, shop foreman and master mechanic would like to locate in Central States either as master mechanic shop foreman or department foreman. Can get results from men and equipment; first-class reference.. State your full proposition in first letter. PW-825, Elec. Ry. Journal, Real Estate Trust Bldg., Philadelphia.

OFFICIAL PROPOSALS

Bids: Feb. 1.

Steel Passenger Car Bodies and Trucks

DEPARTMENT OF CITY TRANSIT
CITY OF PHILADELPHIA
12th Floor, 1211 Chestnut Street
Philadelphia, Pa.

Sealed proposals, addressed to the undersigned at the office above mentioned, will be received until 12 o'clock noon, on Tuesday, February 1, 1921, and opened immediately thereafter for the following work appurtenant to the Frankford Elevated Railway, authorized by Ordinance of Councils approved July 20, 1916, and June 29, 1920.

For furnishing not less than 50 nor more than 100 Steel Passenger Car Bodies, and Mounting Equipment, grouped in Contract supplied by the City, Contract 600.

For furnishing not less than 54 nor more than 104 Motor Trucks, and not less than 52 nor more than 102 Trailer Trucks for Steel Passenger Cars, Contract 601.

Or—for furnishing both the Car Bodies and the Trucks described above, and Mounting Equipment, grouped in Contract 602.

Plans and specifications can be seen at 12th floor, 1211 Chestnut Street, and copies of same with blank forms for proposals will be supplied to intending bidders upon application. A deposit of ten (10) dollars will be required for the plans. This deposit will be refunded on the return of the plans.

In Replying to "Blind" Ads

number in the ad and also local address be careful to put on envelope the key of office to which reply is sent.

10th Ave. at 36th St., New York.
935 Real Estate Trust Bldg., Phila.
533 Leader-News Bldg., Cleveland.
1570 Old Colony Bldg., Chicago.
531 Rialto Bldg., San Francisco.

Important

Original letters of recommendation or other papers of value should not be enclosed to unknown correspondents — send copies.

0195

OFFICIAL PROPOSALS

Contractors will be required to comply with the Act of Assembly of July 18, 1917, relative to Workmen's Compensation Insurance, and proof must be furnished the Department by each Contractor that he has accepted the provisions of said Act and insured his liability thereunder, or secured exemption therefrom.

For each bid a proposal bond in the sum of Five Hundred (500) Dollars must be filed in the Law Department, Room 464, City Hall, in accordance with the ordinance of May 25, 1860, the certificate of such filing to be inclosed with the bid.

The Director reserves the right to reject any or all bids as he may deem best for the interest of the City of Philadelphia.

WILLIAM S. TWINING,
Director.

December 28, 1920.

N. B.: The time for receiving bids has been extended.

FOR SALE

Complete Power Plant

With appurtenances, now in operation, installed five years ago. 150 h.p, 3 cylinder Gas Oil engine, 250 r.p.m., direct connected 100 kilowatt, 600 Volt direct current Railway generator with switch board complete. Storage tanks, air reservoirs, compressor, piping, etc. Guaranteed first-class outfit. Making room larger plant. Low cash price for quick sale. Address,

Bryan & College Interurban Ry.
Bryan, Tex.

FOR SALE

16 West. 56 Motors. 4 K-14 Controllers. 4 National type BB-4 Air Brake Equipments complete. 15 Double Truck Cars, 40-ft. long, mounted on Brill Trucks equipped with 4 GE-67 Motors, 2 K-6 Controllers, Air Brakes, etc., complete.

Electric Equipment Co.
Commonwealth Building, Philadelphia, Pa.

New—Used—Rebuilt

MACHINERY AND SUPPLIES
for construction and industrial work

READING ENGINEERING CO., INC.
154 Nassau St., New York

EVERYTHING FOR TRACK

New and Relaying Rail

FITTINGS AND TOOLS

TRACK SPECIALTIES CO.
29 Broadway, New York City.

COMPLETE POWER PLANT

FOR SALE

1—500 h.p. Westinghouse Compound Engine, Direct Connected to 550 volt Generator.

2—200 h.p. Harrisburg Engines, Belt Connected to Westinghouse Generators.

1—B & W Boiler, 2 Keeler Boilers, Water Heaters, Pumps, Piping, Switchboards and etc.

All in first class operating condition. Immediate delivery. Make us an offer.

The Lewistown & Reedsville Electric Railway Co., Lewistown, Pa.

NEW—80-LB. RAIL and ACCESSORIES

Angle Bars, Spikes, Bolts and Nuts Complete

FOR SALE

A.R.A. "TYPE B" RAIL

Approximately 30,000 gross tons—standard lengths

Stored at Kearney, New Jersey

We buy electric and steam railways that are to be dismantled

HYMAN-MICHAELS COMPANY

NEW AND RELAYING RAILS

Peoples Gas Building, Chicago, Ill.

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1324-1326 Woolworth Bldg.

Pittsburgh Office:
1312 First National Bank Bldg.

St. Louis Office:
2115 Railway Exchange Bldg.

FOR SALE

1—25 ton, electric

Traveling Crane

or hoist symbol made by Niles-Bement-Pond Co.; center to center of runway rails, 78 ft. 4 in.; approximate vertical travel of hook, 24 ft.

United Electric Light Co.
Springfield, Mass.

FOR SALE

USED BRIDGES

4—Plate Girders 40 ft. over-all 4 ft. deep.
2—Plate Girders 48 ft. over-all 5 ft. deep.
2—Plate Girders 42 ft. 8 in. over-all 4 ft. deep.
8—Plate Girders 100 ft. over-all 8 ft. 4 in. deep.
1—Through Truss 154 ft. 6 in. over-all.
1—Through Truss 156 ft. 4 in. over-all.
2—Poney Trusses 89 ft. 6 in. over-all.
1—Pony Truss 79 ft. over-all.
1—Pony Truss 75 ft. over-all.

All in first class condition

C. C. HARRIS
3614 Morris Place, Cincinnati, O.
Station "C"

"Opportunity" Advertising:

Think
"SEARCHLIGHT"
First!

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FOR SALE

Two 300-H.P. 500 Volt MILL MOTORS

Two Westinghouse 300-h.p. 345 to 500 r.p.m., 500 volt, D.C., compound wound motors, with one spare armature, including two Cutler-Hammer, 300-h.p., 500 volt, D.C. Starters.

Condition good. Ready for inspection. Reason for selling, voltage changed. Write

H. LLEWELLYN, General Purchasing Agent
PITTSBURGH STEEL PRODUCTS CO.
Union Arcade Bldg., Pittsburgh, Pa.

NEW
REBUILT **ELECTRIC MOTORS** REWINDING
REPAIRING

NEW A.C. MOTORS ¼ to 15 H.P.—LARGE STOCK USED MOTORS
EXCELLENT REPAIR SERVICE ON ANY SIZE OR TYPE

CLEVELAND ARMATURE WORKS, INC.
EST. 1895 4732-4-6 ST. CLAIR AVE., CLEVELAND O. *INC. 1918*

MACHINERY IN STOCK FOR IMMEDIATE SHIPMENT

STEAM TURBO GENERATING SETS

1—10,000 kw. (13,500 kva.) Westg. 3 ph., 60 cy., 13200 v., 1600 r.p.m. Turbo Unit with Le Blanc Jet Condenser.
1—1500 kva., 2300 v., 3 ph., 60 cy., 3600 r.p.m. Gen. Elec. Turbo Outfit with condensing equipment.
1—1500 kva. Gen. Elec. Curtis 25 cycle turbo unit, 3 ph., 1500 r.p.m., 370 volts, 175 lb. steam pressure.
1—400 kw. Westg., 3 ph., 60 cy., 2200 v., 3600 r.p.m. turbo unit.

FREQUENCY CHANGER SETS

1—1000 kw., 1250 kva., G. E., 2 ph., 62.5 cy., 5400/2700 v., 375 r.p.m. generator dir. ctd. to 1000 hp., 3 ph., 25 cy., 6000 v., 375 r.p.m. motor.
1—500 kw., G. E., 3 ph., 60 cy., 2300 v., 750 r.p.m. generator dir. ctd. to 700 hp., 3 ph., 25 cy., 13200 v., 750 r.p.m. motor.
1—500 kw., G.E., 3 ph., 60 cy., 4150 v., 300 r.p.m. generator dir. ctd. to 800 hp., 3 ph., 25 cy., 9000 v., 300 r.p.m. motor.

MOTOR GENERATOR SETS

1—1000 kw., Westg., 125/250 v., 294 r.p.m. generator dir. ctd. to 1400 hp., 3 ph., 60 cy., 6600/4000 v., 294 r.p.m. motor.
1—200 kw., G. E., 250 v., 900 r.p.m. generator dir. ctd. to 300 hp., 3 ph., 60 cy., 2400 v., 900 r.p.m. motor.
3—100 kw., Westg., 6 pole, 600 v., gen., each dir. ctd. to 150 hp., 3 ph., 25 cy. motor. These are self contained units on cast iron sub-bases.

ROTARY CONVERTERS

1—500 kw., Westg., rotary, 6 ph., 25 cy., 440 v., A.C., 600 v., D.C., 500 r.p.m.
1—500 kw., Gen. Elec., rotary, 600 volt, 60 cy., 1200 r.p.m.
2—300 kw., Westg., 3 ph., 60 cy., 370 v., A.C., 600 v., D.C., 600 r.p.m.
2—300 kw., G. E., 25 cy., 370 v., A.C., 600 v., D.C., 750 r.p.m.
1—150 kw., Westg., 3 ph., 60 cy., 370 v., A.C., 575 v., D.C., 720 r.p.m.
2—150 kw., Gen. Elec., 25 cy., 370 v., A.C., 600 v., D.C., 750 r.p.m.

TRANSFORMERS—25 CY.

6—500 kva., G. E., 13200 prim., 480 secy.
3—200 kva., Westg., 16500 v., prim., 460 secy.
3—200 kw., G. E., 6450 v., prim., 170 secy.
3—185 kva., G. E., 2300 v., prim., 430 secy.
3—150 kw., G. E., 6000 v., prim., 63 secy.
3—125 kw., Westg., 2300 v., prim., 220 secy.
2—75 kva., G. E., 13800 v., prim., 115/230 secy.
3—50 kva., G. E., 13800 v., prim., 115/230 secy.

TRANSFORMERS—60 CY.

1—7500 kva., Westg., 44000/22000-13500 vs.
3—2000 kva., G. E., 66000 v., prim., 6600-13200/22000 v., Y secy.
3—2000 kva., G. E., 66000-2200/4000 Y vs.
2—1250 kva., 3 ph., G. E., 26400/13300 prim., 2400/2200 v., secy.
4—750 kw., G. E., 44000/43000/42000 prim., 6600 secy.
6—600 kva., G. E., 33000/13200 volts.
3—400 kva., Allis-Chalmers, 6600-440 vs.
3—200 kva., G. E., 3200 prim., 370 secy.
3—160 kva., G. E., 6600-120/240 volts.
4—150 kw., Allis-Chalmers, 33000 v., prim., 2300 secy.
6—110 kw., G. E., 14600-13050 v., prim., 430-286-143 v., secy.
3—100 kw., G. E., 9200 v., prim., 2300 secy.
2—100 kw., G. E., 6600/5740 prim., 2760/2400 secy.
3—100 kw., G. E., 6600 v., prim., 605/504 secy.
3—100 kva., Westg., 11000-500 volts.
3—100 kw., Westg., 440 v., prim., 220 secy.
3—75 kva., G. E., 11000/6900-6600 vs.
3—75 kva., G. E., 2300 v., prim., 370 secy.
2—75 kva., Allis-Chal., 6600 v., prim., 440 secy.
3—55 kw., G. E., 3300/2070-370/330/165 vs.
3—50 kva., Westg., 6600/6300/6000 v., prim., 440/220 secy.
2—50 kw., Westg., 5000/6600 v., prim., 1000/1100/2000/2300 v., secy.

ARCHER & BALDWIN, Inc.

Telephone 4337-4338 Rector

114-118 Liberty Street, New York City

Is There A Blast Furnace Near You?

CERTAINLY there's a market for scrap iron — steel plants buy it. But why let that old hoist, sinker pump, station pump, boiler, or any other machinery which is not in use rust out and become scrap, or take up room indefinitely in your storehouse while waiting for some local operator to buy it.

Advertise your surplus machinery. You know its worth; tell others. There's someone who needs just that type of machine and SEARCHLIGHT can find him for you. Write for information.

"SEARCHLIGHT" Service

Secures Satisfactory Sales

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Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

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Air Aftercoolers
Ingersoll-Rand Co.

Air Receivers
Ingersoll-Rand Co.

Anchors, Guy
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Angle Bars
Lackawanna Steel Co.

Automobiles and Buses
Brill Co., The J. G.

Axles
Bemis Car Truck Co.
Midvale Steel & Ordnance Co.

Axle Straighteners
Columbia M. W. & M. I. Co.

Axles, Car Wheel
Bemis Car Truck Co.
Brill Co., The J. G.
Standard Steel Works Co.
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Babbitt Metal
More-Jones Brass & Metal Co.

Babbitting Devices
Columbia M. W. & M. I. Co.

Badges and Buttons
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Electric Service Supplies Co.
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Batteries, Dry
Nichols Lintern Co.

Batteries, Storage
Electric Storage Battery Co.

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Eureka Co.
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Post & Co.; Inc., E. L.
Westinghouse Elec. & Mfg. Co.

Bearings, Center and Roller Side
Stucki Co., A.

Bearings, Roller and Ball
Railway Roller Bearing Co.

Bells and Gongs
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
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Benders, Rail
Niles-Bement Pond Co.

Boilers
Babcock & Wilcox Co.

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National Tube Co.

Bond Testers
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American Steel & Wire Co.
Electric Railway Improv. Co.
Electric Service Supplies Co.
Ohio Brass Co.
Rail Welding & Bonding Co.

Bonds, Rail
American Steel & Wire Co.
Copper Clad Steel Co.
Electric Railway Improv. Co.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Rail Welding & Bonding Co.
Westinghouse Elec. & Mfg. Co.

Boring Tools, Car Wheel
Niles-Bement-Pond Co.

Boxes—Junction and Outlet
National Metal Molding Co.

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Bates Expanded Steel Truss Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
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National Ry. Appliance Co.
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Brake Shoes
Amer. Brake Shoe & Fdry. Co.
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Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
National Brake Co.
Safety Car Devices Co.
Westinghouse Traction Brake Co.

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Zelnicker, W. A., Supply Co., Inc.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Morganite Brush Co.
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Irvington Varnish & Insulator Co.

Cambric, Yellow and Black Varnished
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Carbon Brushes. (See Brushes, Carbon

Car Heaters
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Car Panel Safety Switches
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Differential Car Co.

Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
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Kuhlman Car Co., G. C.
McGuire-Cummings Mfg. Co.
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Wason Mfg. Co.

Cars, Second Hand
Electric Equipment Co.

Cars, Self-Propelled
Electric Storage Battery Co.
General Electric Co.

Castings, Brass, Composition or Copper
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.
More-Jones Brass & Metal Co.

Castings, Gray Iron and Steel
American Steel Foundries
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Standard Steel Works Co.

Castings, Malleable and Brass
Amer. Brake Shoe & Fdry Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.

Catchers and Retrievers, Trolley
Earll, Chas. I.
Electric Service Supplies Co.
Ohio Brass Co.
Trolley Supply Co.
Wood Co., Chas. N.

Ceiling, Car
Keyes Products Co.

Checks, Employees
American Railway Supply Co.

Circuit Breakers
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Clamps and Connectors for Wires and Cables
Anderson Mfg. Co., A. & J. M.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Eureka Co.
General Electric Co.
Hubbard & Co.
Klein & Sons, Mathias
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Cleaners and Scrapers—Track (See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
Ohio Brass Co.

Cleats
National Metal Molding Co.

Clusters and Sockets
General Electric Co.

Coal and Ash Handling. (See Conveying and Hoisting Machinery)

Coil Banding and Winding Machines
Columbia M. W & M. I. Co.
Electric Service Supplies Co.

Coils, Armature and Field
Cleveland Armature Works
Columbia M. W. & M. I. Co.
General Electric Co.
Independent Lamp & Wire Co.
Westinghouse Elec. & Mfg. Co.

Coils, Choke and Kicking
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Coin-Counting Machines
Electric Service Supplies Co.
International Register Co., The
Johnson Fare Box Co.

Commutator Slotters
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Commutator Truing Devices
General Electric Co.

Commutators or Parts
Cameron Electrical Mfg. Co.
Cleveland Armature Works
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
Mica Insulator Co.
Westinghouse Elec. & Mfg. Co.

Compressors, Air
General Electric Co.
Ingersoll-Rand Co.
Westinghouse Trac. Brake Co.

Compressors, Gas
Ingersoll-Rand Co.

Concrete Mixers
Blaw-Knox Co.

Condensers
General Electric Co.
Schutte & Koerting Co.
Westinghouse Elec. & Mfg. Co.

Condensor Papers
Irvington Varnish & Insulator Co.

Conduit Fittings
Chicago Fuse Mfg. Co.

Conduits, Flexible
Tubular Woven Fabric Co.

Conduits, Interior
National Metal Molding Co.

Connectors, Solderless
Frankel Connector Co.
Westinghouse Elec. & Mfg. Co.

Controller Fingers
Russell Mfg. Co.

Controllers or Parts
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
Russell Mfg. Co.
Westinghouse Elec. & Mfg. Co.

Controller Regulators
Elec. Service Supplies Co.

Controlling Systems
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Converters, Rotary
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Conveyors, Coal and Ash
Green Eng. Co.

Conveying and Hoisting Machinery
Columbia M. W. & M. I. Co.
Portable Machinery Co.

Copper Wire
Anaconda Copper Mining Co.
Copper Clad Steel Co.

Cord, Bell, Trolley, Register, etc.
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Roebling's Sons Co., John A.
Samson Cordage Works
Silver Lake Co.
Trolley Supply Co.

Cord Connectors and Couplers
Electric Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car
Brill Co., The J. G.
Gould Coupler Co.
Ohio Brass Co.
Westinghouse Trac. Brake Co.

Cranes
Niles-Bement-Pond Co.
Whiting Corp.

Cross Arms. (See Brackets)

Crossing Foundations
International Steel Tie Co.

Crossing Signals. (See Signals, Crossing)

Crossings, Frog & Switch
Wharton, Jr., & Co., Wm.

Crossings, Track. (See Track, Special Work)

Culverts
Canton Culvert & Silo Co.

Curtains and Curtain Fixtures
Brill Co., The J. G.
Electric Service Supplies Co.

Cutouts
Chicago Fuse Mfg. Co.

Dealers' Machinery
Archer & Baldwin
Electric Equipment Co.
Foster Co., L. B.
Hyman Michaels Co.

Derailing Devices. (See also Track Work)
Cleveland Frog & Crossing Co.
Wharton, Jr. & Co., Wm.

Destination Signs
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

Detective Service
Wish Service, P. Edward

Dogs, Lathe
Williams & Co., J. H.

Door Operating Devices
Consolidated Car Heating Co
National Pneumatic Co., Inc.
Safety Car Devices Co.

Doors and Door Fixtures
Brill Co., The J. G.
General Electric Co.

Doors, Folding Vestibule
National Pneumatic Co., Inc.

Draft Rigging. (See Couplers)

Drills, Rock
Ingersoll-Rand Co.

Drills, Track
American Steel & Wire Co.
Electric Service Supplies Co.
Niles-Bement-Pond Co.
Ohio Brass Co.

Drinking Cups, Sanitary Paper
Individual Drinking Cup Co., Inc.

Dryers, Sand
Electric Service Supplies Co
Zelnicker Supply Co., Inc., Walter A.

Electrical Wires and Cables
Roebling's Sons Co., J. A.

Engineers, Consulting, Contracting and Operating
Allison & Co., J. S.
Archbold-Brady Co.
Arnold Co., The
Byllesby Engineering & Management Corp.
Clark Management Corp., E. W
Day & Zimmermann, Inc.
Drum & Co., A. L.
Feustel, Robert M.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Englehardt W.
Jackson, Walter.
Jacobs & Co., J. L.
Kelly, Cooke & Co.
Republic Engineers, Inc.
Richey, Albert S.
Sanderson & Porter
Scofield Engineering Co.
Stone & Webster
White Engineering Corp., The J.G.

Engines, Gas, Oil or Steam
Ingersoll-Rand Co.
Westinghouse Elec. & Mfg. Co

Fabricated Steel
Blaw-Knox Co.

Fare Boxes
Brill Co., The J. G.
Cleveland Fare Box Co.
Economy Electric Devices Co.
Johnson Fare Box Co.
Ohmer Fare Register Co.
National Railway Appliance Co.

A Dependable Outlet for Enamel Magnet Wire

For those who require better insulation than the ordinary cotton and silk covering affords. This new Enamel wire will give the desired results.

When used with cotton and silk covering it gives a much increased insulation value.

When used without cotton or silk covering it takes up much less space and has good insulation value.

Will not crack when bent and will not get brittle when subjected to high temperatures.

Write for details.

Independent Lamp & Wire Co., Inc.

OFFICES:
1737 Broadway, New York

FACTORIES:
York, Pa., and Weehawken, N. J.

Be Independent of Coil Trouble use SALAMANDER Pure Asbestos

During the rush hours when your motors are greatly overloaded and become excessively hot you need not have any fear of burnouts if the coils are insulated with Salamander Pure Asbestos. It will not burn no matter how hot it gets.

Send us your burnout coils and let us rewind them for you. We are in a position to rush work, thereby helping you out of your difficulties.

Independent Lamp & Wire Co., Inc.

OFFICES:
1737 Broadway, New York

FACTORIES:
York, Pa., and Weehawken, N. J.

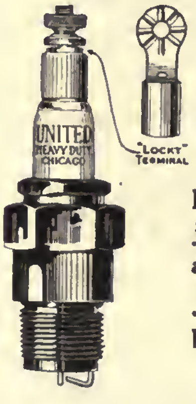
A REAL RAIL BOND TESTER

The Vawter New Type Direct Reading Instrument is in a Class by Itself

Send for Bulletin if you have Rail Bonds

THOMPSON-LEVERING COMPANY
PHILADELPHIA, PA., U. S. A.

Buy Your Motor Bus and Truck Accessories at Jobbers' Prices



UNITED SPARK PLUGS

Heavy duty, retail price $1.00, jobbers 45c., for buses, trucks and heavy cars.

Junior, retail price 75c., jobbers 35c., for light cars.

We can also supply you with Velvet Recoil Deadeners for $35.00 per set, also Aero Carburetors, $35.00; Opco Carbon Remover, 10 quarts, $10.00 per case.

We would suggest that you write us for folders relative to these accessories before purchasing elsewhere.

BLOCK AUTOMOTIVE CO.
Charlotte, N. C.

WHAT AND WHERE TO BUY

Feed Water Heaters
Schutte & Koerting Co.

Fences, Woven Wire and Fence Posts
American Steel & Wire Co.

Fenders and Wheel Guards
Brill Co., The J. G.
Cleveland Fare Box Co.
Consolidated Car Fender Co.
Electric Service Supplies Co.
Star Brass Works

Fibre and Fibre Tubing
Continental Fibre Co.
Johns-Manville Co., Inc.
Westinghouse Elec. & Mfg. Co.

Field Coils. (See Coils)

Filters, Water
Scaife & Sons Co., Wm. B.

Fire Extinguishing Apparatus
Johns-Manville Co., Inc.

Flaxlinum Insulation
National Railway Appliance Co.

Floodlights
Electric Service Supplies Co.

Flooring Composition
American Mason Safety Tread Co.

Forgings
Columbia M. W. & M. I. Co.
Eureka Co.
Standard Steel Works Co.
Williams & Co., J. H.

Foundry Equipment
Whiting Corp.

Frogs, Track. (See Track Work)

Funnel Castings
Wharton, Jr., Inc., & Co., Wm.

Fuses and Fuse Boxes
Chicago Fuse Mfg. Co.
Columbia M. W. & M. I. Co.
General Electric Co.
Johns-Manville Co., Inc.
Westinghouse Elec. & Mfg. Co.
Williams & Co., J. H.

Fuses, Refillable
Chicago Fuse Mfg. Co.
Columbia M. W. & M. I. Co.
General Electric Co.

Gages, Oil and Water
Ohio Brass Co.

Gaskets
Power Specialty Co.
Westinghouse Traction Brake Co.

Gas-Electric Cars
General Electric Co.

Gas Producers
Westinghouse Elec. & Mfg. Co.

Gates, Car
Brill Co., The J. G.

Gear Blanks
Standard Steel Works Co.

Gear Cases
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Westinghouse Elec. & Mfg. Co.

Gears and Pinions
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
National Railway Appliance Co.
Nuttall Co., R. D.
Tool Steel Gear & Pinion Co.

Generating Sets, Gas-Electric
General Electric Co.

Generators
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Gongs. (See Bells and Gongs)

Graphite
Morganite Brush Co.

Grates, Chain
Green Eng. Co.

Greases. (See Lubricants)

Grinders and Grinding Supplies
Metal & Thermit Corp.
Railway Track-work Co.

Grinding Blocks and Wheels
Railway Track-work Co.

Guards, Trolley
Electric Service Supplies Co.
Ohio Brass Co.

Harps, Trolley
Anderson Mfg. Co., A. & J. M.
Bayonet Trolley Harp Co.
Electric Service Supplies Co.
More-Jones B. & M. Co.
Nuttall Co., R. D.
Star Brass Works

Headlights
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Trolley Supply Co.

Headlining
Keyes Products

Heaters, Car (Electric)
Consolidated Car Heating Co.
Economy Electric Devices Co.
Gold Car Heating & Lighting Co.
National Ry. Appliance Co.
Smith Heater Co., Peter

Heaters, Car, Hot Air and Water
Cooper Heater Co.
Smith Heater Co., Peter

Heaters, Car (Stove)
Electric Service Supplies Co.
Smith Heater Co., Peter

Hoists and Lifts
Columbia M. W. & M. I. Co.
Ford-Chain Block Co.
Niles-Bement-Pond Co.
Toledo Bridge & Crane Co., The

Hose
Ingersoll-Rand Co.

Hose, Bridges
Ohio Brass Co.

Hydraulic Machinery
Niles-Bement-Pond Co.

Injectors
Schutte & Koerting Co.

Inspection
Electrical Testing Lab's

Instruments, Measuring, Testing and Recording
Economy Electric Devices Co.
General Electric Co.
Thompson-Levering Co.
Westinghouse Elec. & Mfg. Co.

Insulating Cloth, Paper and Tape
General Electric Co.
Hope Webbing Co.
Mica Insulator Co.
Sherwin-Williams Co.
Standard Underground Cable Co.
Westinghouse Elec. & Mfg. Co.

Insulating Material, China and Porcelain
Jeffery Dewitt Insulator Co.

Insulating Varnishes
Irvington Varnish & Insulator Co.

Insulation. (See also Paints)
Anderson M. Co., A. & J. M.
Dolph Co., J. C.
Electric Ry. Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Johns-Manville Co., Inc.
Westinghouse Elec. & Mfg. Co.

Insulators. (See also Line Material)
Anderson M. Co., A. & J. M.
Drew Electric & Mfg. Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Hemingray Glass Co.
Johns-Manville Co., Inc.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Insulators, China, Porcelain and Composition
Jeffery Dewitt Insulator Co.

Insulator Pins
Electric Service Supplies Co.
Hubbard & Co.

Jacks. (See also Cranes, Hoists and Lifts)
Brill Co., The J. G.
Buckeye Jack Mfg. Co.
Columbia M. W. & M. I. Co.

Joints, Rail
Rail Joint Co.
Zelnicker Supply Company, Inc., Walter A.

Journal Boxes
Bemis Car Truck Co.
Brill Co., J. G.
Railway Roller Bearing Co.

Junction Boxes
Standard Underground Cable Co.

Lamp Guards and Fixtures
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
National Electric Specialty Co.
Westinghouse Elec. & Mfg. Co.

Lamps, Arc and Incandescent. (See also Headlights)
Anderson M. Co., A. & J. M.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Lamps, Signal and Marker
Nichols-Lintern Co.
Ohio Brass Co.

Lathe Attachments
Williams & Co., J. H.

Lathes, Car Wheel
McCabe Lathe & Machinery Corp., J. J.
Niles-Bement-Pond Co.

Lightning Protection
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Line Material. (See also Brackets, Insulators, Wires, etc.)
Anderson M. Co., A. & J. M.
Archbold-Brady Co.
Columbia M. W. & M. I. Co.
Drew Electric & Mfg. Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Eureka Co.
General Electric Co.
Hubbard & Co.
Johns-Manville Co., Inc.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Loaders, Wagon, Truck or Car
Portable Machinery Co.

Locking Spring Boxes
Wharton, Jr., & Co., Wm.

Locomotives, Electric
Brill Co., The J. G.
General Electric Co.
McGuire-Cummings Mfg. Co.
Westinghouse Elec. & Mfg. Co.

Lubricating Engineers
Galena-Signal Oil Co.
Universal Lubricating Co.

Lubricants, Oil and Grease
Galena-Signal Oil Co.
Universal Lubricating Co.

Machine Tools
Columbia M. W. & M. I. Co.
Niles-Bement-Pond Co.

Machine Work
Columbia M. W. & M. I. Co.

Machinery, Insulating
American Insulating Machine Co.

Magnet Wire
Belden Mfg. Co.

Manganese Steel Castings
Wharton, Jr., & Co., Wm.

Manganese Steel Special Track Work
Wharton, Jr., & Co., Wm.

Meters (See Instruments)
Electric Service Supplies Co.

Meters, Car, Watthour
Economy Electric Device Co.

Mica
Mica Insulator Co.

Mirrors for Motormen
Drew Elec. & Mfg. Co.

Molded Insulation and Parts
Belden Mfg. Co.

Motormen's Seats
Electric Service Supplies Co.
Wood Co., Chas. N.

Motors, Electric
Westinghouse Elec. & Mfg. Co.

Motors and Generators, Sets
General Electric Co.

Molding, Metal
National Metal Molding Co.

Nuts and Bolts
Barbour-Stockwell Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Hubbard & Co.

Oils. (See Lubricants)

Oil Burning Equipment
Schutte & Koerting Co.

Oxy-Acetylene (See Cutting Apparatus Oxy.)

Packing
Post & Co., Inc., E. L.
Westinghouse Elec. & Mfg. Co.

Paints & Varnishes (Preservative)
Sherwin-Williams Co.

Paints and Varnishes (Insulating)
American Di-Electrics, Ltd.
Dolph Co., John C.
Johns-Manville Co., Inc.
Sherwin-Williams Co.

Paints and Varnishes for Woodwork
National Ry. Appliance Co.
Sherwin-Williams Co.

Paving Material
American Brake Shoe & Fdry. Co

Pickups, Trolley Wire
Electric Service Supplies Co.
Ohio Brass Co.

Pinion Pullers
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
Wood Co., Chas. N.

Pinions. (See Gears)

Pins, Case Hardened, Wood and Iron
Bemis Car Truck Co.
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse Traction Brake Co

Pipe
National Tube Co.

Pipe Fittings
Power Specialty Co.
Standard Steel Works Co.
Westinghouse Traction Brake Co.

Planers. (See Machine Tools)

Pliers, Insulated
Electric Service Supplies Co.

Plugs
National Metal Molding Co.

Pneumatic Tools
Ingersoll-Rand Co.

Pole Reinforcing
Hubbard & Co.

Poles, Metal Street
Bates Expanded Steel Truss Co
Electric Railway Equipment Co.
Hubbard & Co.

Pole Sleeves
Drew Elec. & Mfg. Co.

Poles, Posts, Piling and Lumber
Bennett-Field Cross Tie Co.
Duncan Lumber Co.

Poles, Trolley
Anderson Mfg. Co., A. & J. M.
Bayonet Trolley Harp Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
National Tube Co.
Nuttall Co., R. D.

Poles, Tubular Steel
Electric Railway Equipment Co.
National Tube Co.

Power Saving Devices
Economy Electric Devices Co.
National Ry. Appliance Co.

Pressure Regulators
General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Pumps
Schutte & Koerting Co.

Punches, Ticket
American Railway Supply Co.
Bonney-Vehslage Tool Co.
International Register Co., The
Wood Co., Chas. N.

Purifiers, Feed Water
Scaife & Sons Co., Wm. B.

Rails
Foster Co., L. B.
Lackawanna Steel Co.
Midvale Steel & Ordnance Co.

Rail Grinders. (See Grinders)

Rail Joint Plates
Lackawanna Steel Co.

Rail Welding. (See Brazing and Welding Processes)
Rail Welding and Bonding Co.

Rails, Relaying
Foster Co., L. B.
Zelnicker, Walter A., Supply Co., Inc.

Railway Safety Switches
Westinghouse Elec. & Mfg. Co.

Rattan
Brill Co., The J. G.
Electric Service Supplies Co.
McGuire-Cummings Mfg. Co.

Registers and Fittings
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Ohmer Fare Register Co.
Rooke Automatic Register Co.

Reinforcement, Concrete
American Steel & Wire Co.

Repair Shop Appliances. (See also Coil Banding and Winding Machines)
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

Repair Work. (See also Coils)
Cleveland Armature Works
Columbia M. W. & M. I. Co.
General Electric Co.
Independent Lamp & Wire Co.
Westinghouse Elec. & Mfg. Co.

Replacers, Car
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

Resistance, Grid
Columbia M. W. & M. I. Co.

Resistance, Wire and Tube
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Retrievers, Trolley. (See Catchers and Retrievers, Trolley)

Rheostats
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Roofing, Car
Keyes Products Co.

Rosettes
National Metal Molding Co.

Rubber Covered Wire and Cable
Belden Mfg. Co.

What Does the Imperial Pneumatic Tie Tamper Do?

Affords a big saving over handwork in tamping—as much as $200 per mile.

Reduces the size of the labor gang—6 or 7 men do the work of 15 to 20 men with hand tools.

Gives a more permanent construction—the track stands up about twice as long.

Does not injure or sliver the ties.

Works where tamping picks cannot be used as around frogs, switches and crossings.

Breaks out concrete—up to eight inches in thickness.

Removes other kinds of paving such as asphalt, paving blocks, etc.

Operates pneumatic tools—Drills, Reamers, Hammers—from the compressor car.

Drills rails for bonding—70—9/32-in. holes with a No. 5 Drill per hour.

Operates Sandblast and Paintspray—saving in labor cost and time of cleaning and painting.

Has many other uses—for breaking frozen coal, ore and stock debris out of cars, operating jackhammers, woodborers, spike drivers and many other purposes.

Catalog 9123 gives the details

Ingersoll-Rand Company
11 Broadway, New York

145-TT

WHAT AND WHERE TO BUY

Sanders, Track
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Nicholas-Lintern Co.
Ohio Brass Co.

Sash Fixtures, Car
Brill Co., The J. G.

Scrapers, Track. (See Cleaners and Scrapers, Track)

Seats, Car. (See also Rattan)
Brill Co., The J. G.

Second-Hand Equipment
Archer & Baldwin
Cleveland Armature Works
Foster Co., L. B.
Hyman Michaels Co.
Zelnicker Supply Co., Inc., Walter A.

Shades, Vestibule
Brill Co., The J. G.

Shovels
Brill Co., The J. G.
Hubbard & Co.

Signals, Car
Nicholas-Lintern Co.

Signals, Car Starting
Consolidated Car Heating Co.
Electric Service Supplies Co.
National Pneumatic Co., Inc.

Signal Systems, Block
Electric Service Supplies Co.
Nachod Signal Co., Inc.
U. S. Electric Signal Co.
Wood Co., Chas. N.

Signal Systems, Highway Crossing
Nachod Signal Co., Inc.
U. S. Electric Signal Co.

Slack Adjusters. (See Brake Adjusters)

Slag
Carnegie Steel Co.

Sleet Wheels and Cutters
Anderson Mfg. Co., A. & J. M.
Bayonet Trolley Harp Co.
Columbia M. W. & M. I. Co.
Drew Electric & Mfg. Co.
Electric Railway Equipment Co.
More-Jones Brass & Metal Co.
Nuttall Co., R. D.

Snow-Plows, Sweepers and Brooms
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Consolidated Car Fender Co.
McGuire-Cummings Mfg. Co.

Sockets and Receptacles
National Metal Molding Co.

Soldering and Brazing Apparatus. (See Welding Processes and Apparatus)

Solderless Connectors
Frankel Connector Co.

Special Adhesive Papers
Irvington Varnish & Insulator Co.

Spikes
American Steel & Wire Co.

Splicing Compounds
Westinghouse Elec. & Mfg. Co.

Splicing Sleeves. (See Clamps and Connectors)

Spray Nozzles
Schutte & Koerting Co.

Springs, Car and Truck
American Steel Foundries
American Steel & Wire Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Standard Steel Works Co.

Sprinklers, Track and Road
Brill Co., The J. G.
McGuire-Cummings Mfg. Co.

Steel Castings
Wharton, Jr., & Co., Wm.

Turnstiles
Perly Mfg. Co., Inc.

Steel Forms
Blaw-Knox Co.

Steps, Car
American Mason Safety Tread Co.

Stokers, Mechanical
Babcock & Wilcox Co.
Westinghouse Elec. & Mfg. Co.

Storage Batteries. (See Batteries, Storage)

Strand
Copper Clad Steel Co.
Roebling's Sons Co., J. A.

Structural Steel
Lackawanna Steel Co.

Superheaters
Babcock & Wilcox Co.
Power Specialty Co.

Sweepers, Snow. (See Snow Plows, Sweepers and Brooms)

Switch Stands
Ramapo Iron Works

Switches, Track. (See Track Special Work)

Switchboxes
Chicago Fuse Mfg. Co.

Switches and Switchboards
Allis-Chalmers Mfg. Co.
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Synchroscopes
Weston Elec'l Instrument Co.

Tampers, Tie
Ingersoll-Rand Co.

Tapes and Cloths. (See Insulating Cloth, Paper and Tape)

Telephones and Parts
Electric Service Supplies Co.

Terminals, Cable
Standard Underground Cable Co.

Testing, Commercial and Electrical
Elec'l Testing Laboratories

Testing Instruments. (See Instruments, Electrical Measuring, Testing, etc.)

Thermostats
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Railway Utility Co.
Smith Heater Co., Peter

Ticket Choppers and Destroyers
Electric Service Supplies Co.

Tie Plates
Lackawanna Steel Co.
Midvale Steel & Ordnance Co.

Ties, Mechanical
Dayton Mechanical Tie Co.

Ties and Tie Rods, Steel
Barbour-Stockwell Co.
International Steel Tie Co.

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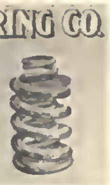

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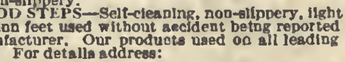

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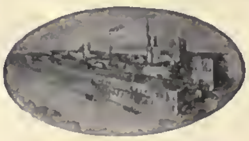

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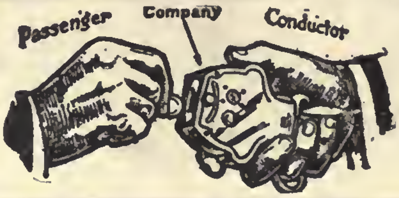

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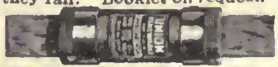

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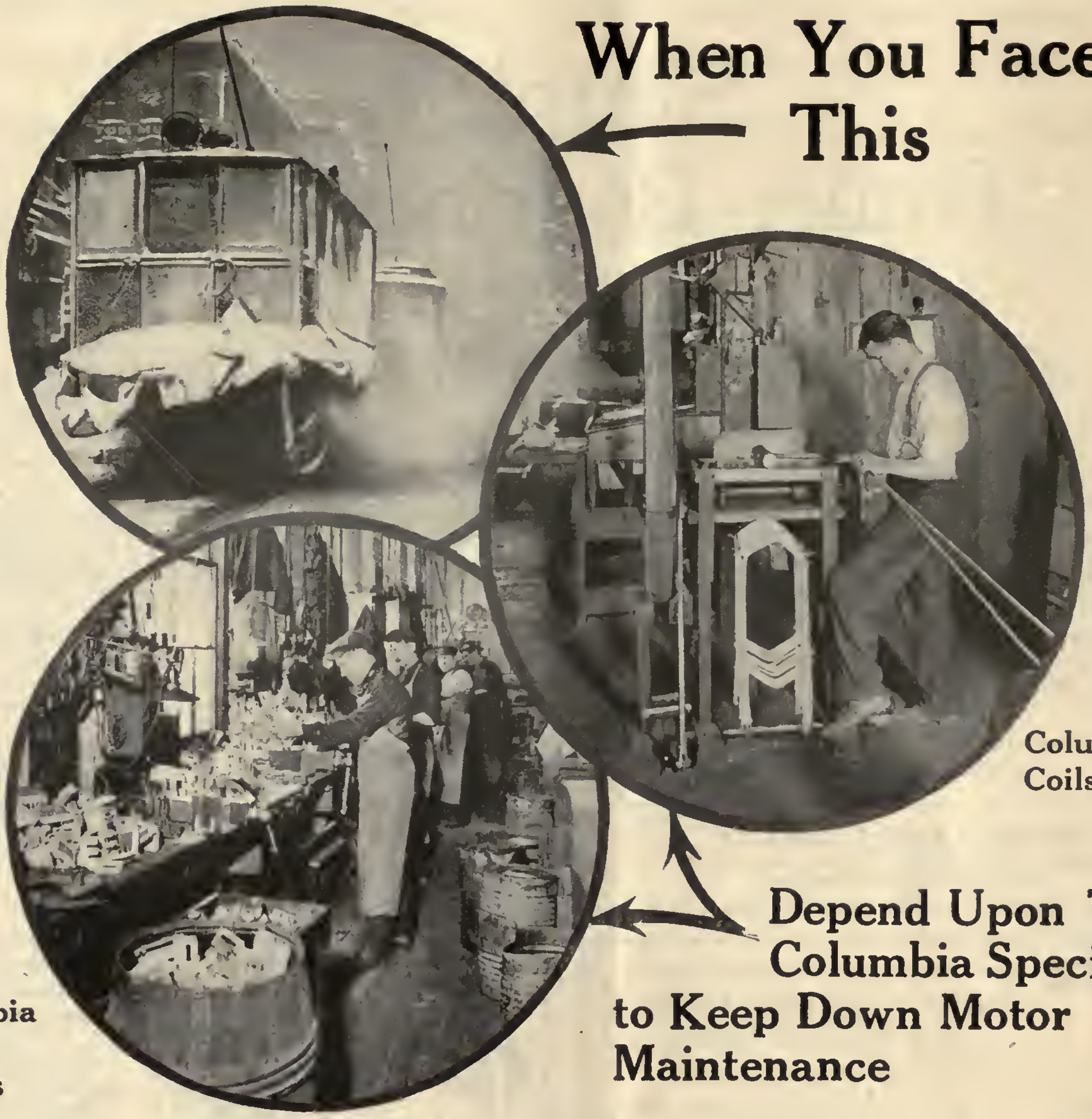

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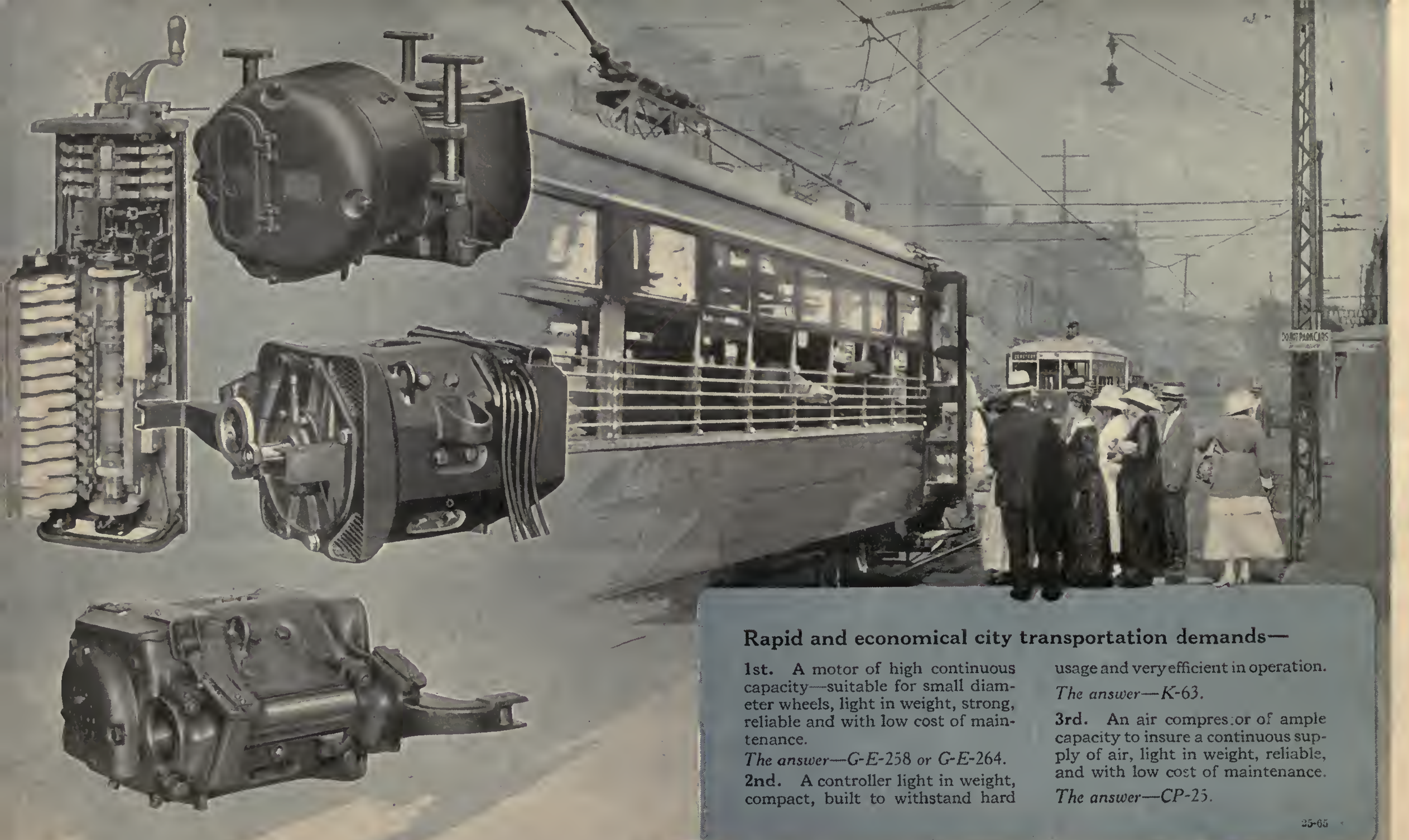

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Vol. 57, No. 4 New York, January 22, 1921 *Pages* 165-206

Electric Railway Journal

Henry W. Blake and Harold V. Bozell, Editors Henry H. Norris, Managing-Editor

Contents

Operation of Two-Car Trains in Washington, D. C.

Old open cars are being converted into trailers for train operation. Extensive power consumption studies indicate a low cost of trailer operation. To adapt two-car train to operate on Stub-End Lines, trailer is equipped with controller and plow. Fifty trailers now being converted for this purpose.......Page 168

Underlying Principle of Public Service

This is best obtained under the service-at-cost plan, whose natural result is to establish co-operation and remove antagonism between the city and operating company, declares Edwin F. Sweet. It also permits utilities safely to become monopolies and reduces the reasons for labor difficulties, thus making continuous service more certain..Page 171

Indiana Utilities Meet to Discuss Public Relations

Presidents Gadsden, Insull and Munroe of American Electric Railway, Electric Light and Gas Associations were speakers at the first annual meeting, which was attended by more than 250. Addresses given by Commissioners Paul P. Haynes and E. K. Hall, American Telephone and Telegraph Company. Charles L. Henry presided...Page 181

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Circulation of this issue, 6,528

Advertising Index—Alphabetical, 46; Classified, 40, 42, 44; Searchlight Section, 37-39

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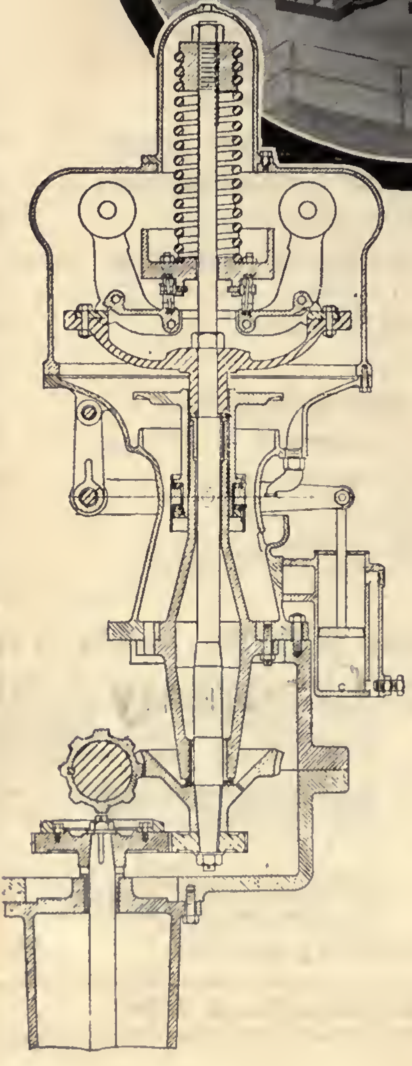
One of the Two 20,000 K.W. Westinghouse Turbine Generators, at West Penn Power Co. Springdale, Pa.

Reliable and Why—



Governor

The Westinghouse governor here illustrated is designed with massive weights to provide more than the needed power. These weights are concentrated and are supported by arms of relatively no mass in order to assure constant regulating characteristics throughout the governing range.

The governor parts have a maximum degree of angular motion which is imperatively essential to reliable regulation.

Friction seriously interferes with the operation of any governor. Note the pains taken to prevent friction—all weights and arms are swung on knife edges.

The governor clutch, which must slide with minimum friction, is arranged to have revolving motion at right angles to its sliding stem, absolutely overcoming sliding friction.

All governor working parts are served by the oiling system of the main turbine, thus rendering the life of the governor parts indefinite.

Westinghouse Electric & Mfg. Co.
East Pittsburgh, Pa.

Sales Offices in All Large American Cities

—the Brake which automatically weighs its passengers and likewise adjusts Braking Power to make stopping distance the same with loaded, partly loaded and empty trains

8-car train on the Municipal Railway, New York City, fitted with Variable-Load Brakes.

The "Rush Hour"

The Westinghouse Variable Load Brake, as designed for the New York Municipal Railway, is a development that greatly facilitates the handling of an enormous volume of traffic in a densely populated Metropolitan District.

The Variable Load Equipment automatically adjusts the braking force to conform with the weight of the load. This insures uniform stops, whether with 100 passengers or 2,000, and permits of closer block spacing and consequently the operation or more trains with greater frequency.

The results are mutually beneficial to the "Municipal" and its patrons, the former being enabled to increase its revenue substantially by extending its facilities, and the latter enjoying better, speedier service, a consideration of the first magnitude during New York's famous "rush hours."

Westinghouse Traction Brake Company

General Offices: Pittsburgh, Pa.
Works: Wilmerding, Pa.

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San Francisco

Washington

Chicago
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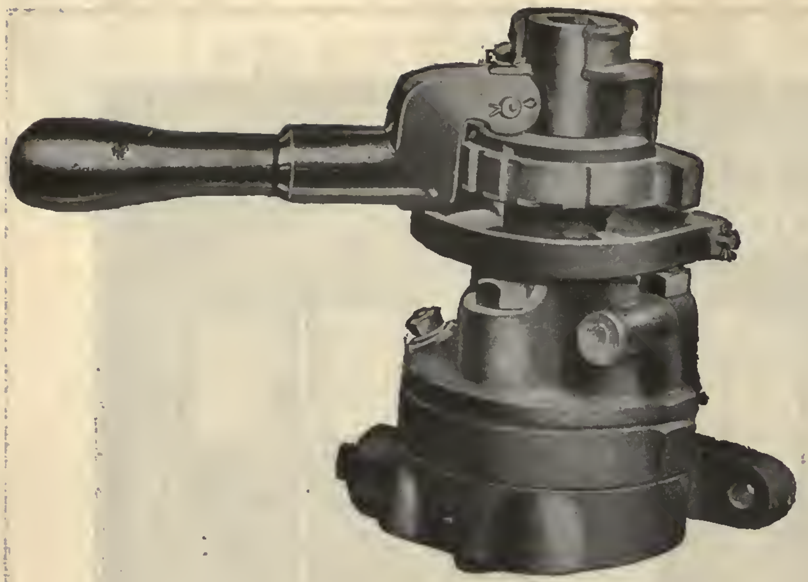

Air Brake
and
Safety Car
Control
Equipment

Regaining Profitable Patronage

Many Electric Railways have suffered the loss of profitable, short haul patronage, due to the apparent inability to keep service apace with the demands of the public.

Service then—more service and better service—is the only means of regaining this profitable short haul patronage. This can be accomplished with One Man Safety Cars.

With Safety Cars, one operator is employed instead of two. Safety Cars insure a notable improvement in speed and safety. They make possible short headway operation. They reduce operating costs and increase revenue.

But remember—it is a Safety Car only when equipped with automatic, laborless apparatus, so interlocked that, regardless of the illness or distraction of the operator, the power will be cut off instantaneously, the air brakes and sander apply immediately thereafter and the doors unlock for safe and easy exit. Furthermore, it is a Safety Car only when the doors must be closed before the car can start, and when the air brake must be applied before the doors are opened and the step lowered in bringing the car to a service stop.

SAFETY CAR DEVICES COMPANY

Main Office—Boatmen's Bank Bldg., ST. LOUIS, MO.

CHICAGO
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NEW YORK
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PITTSBURGH
Westinghouse Bldg.

SAN FRANCISCO
Southern Pacific Bldg.

CANADA—Canadian Westinghouse Co., Ltd., Hamilton, Ont.

This Railway Found Rail Bonding an Indispensable Investment

An eastern property of medium size was spending at the rate of two thousand dollars a month for motor repairs. Most of this expense was traced to a poor return circuit. O-B Bonds proved to be the remedy. When they were on the rails the intolerable condition was corrected.

Burning-out of armatures is only one result of neglected bonding.

Every poorly bonded joint adds its toll to power cost. Service suffers because cars cannot operate at normal speed on low voltage.

If you are planning minimum operating expense and maximum operating revenue for this year get a sensible appropriation for rail bonding—and use it.

You will find the "Return Circuit" useful. It contains authoritative and complete information on rail bonding and is free to electric railway men.

THE OHIO BRASS COMPANY, Mansfield, Ohio

Manufactures:
Trolley Materials, Rail Bonds,
High Tension Insulators,
Third Rail Insulators.

New York, Philadelphia,
Chicago, Pittsburgh,
Los Angeles, San Francisco
Paris, France.

"You Are Paying More for Poor Bonding Than Good Bonding Costs." O-B Bonds Are Good Bonds. A few representative types are shown here.

Type AW-3 Bond for Ball of Rail. Also made for Base of Rail.

O-B Arc Weld Bonds have four fundamental features which simplify installation and make a better weld possible.

Type ST-2 Bond.

O-B Gas Weld Bonds were pioneers. They are still first.

Type F-3 Bond.

Concealed Type of Bond, installed under splice bar.

Type E-2 Bond.

A long bond for around the splice bar. Especially valuable on joints where rail movement is considerable.

O-B Stud Terminal Bonds are made in all lengths and capacities with either compressed or pin driven terminals.

Phono-Electric Trolley Wire Keeps The Overhead Line Intact on Tampa's Important Streets

Tampa cars run from 15-ton open-benchers of the past down to the little safety car of less than half that weight.

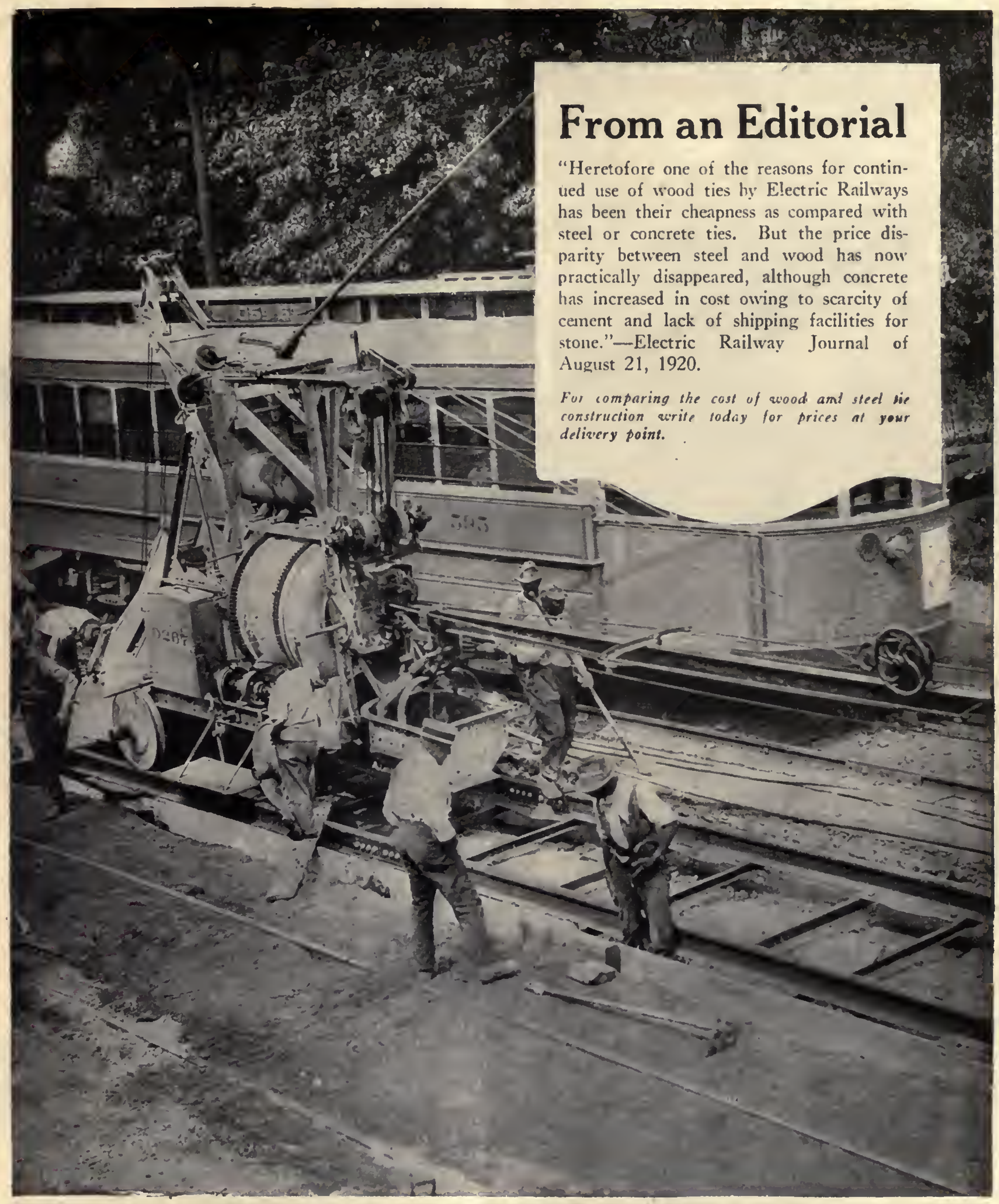
Most of them foregather on Franklin Street, the liveliest part of a lively city.

That's the place, of course, where the Tampa Electric Company put up No. 00 Phono-Electric Trolley Wire a couple of years ago—just as it did on many curves.

And the proved toughness and durability of Phono-Electric Trolley Wire will keep these critical parts of the system free from overhead breakdown and replacements for many years to come.

Bridgeport Brass Company

Bridgeport Connecticut



From an Editorial

"Heretofore one of the reasons for continued use of wood ties by Electric Railways has been their cheapness as compared with steel or concrete ties. But the price disparity between steel and wood has now practically disappeared, although concrete has increased in cost owing to scarcity of cement and lack of shipping facilities for stone."—Electric Railway Journal of August 21, 1920.

For comparing the cost of wood and steel tie construction write today for prices at your delivery point.

The International Steel Tie Company

Manufacturers of Steel Twin Ties and Crossing Foundations

General Sales Office and Works: Cleveland, Ohio

BEFORE

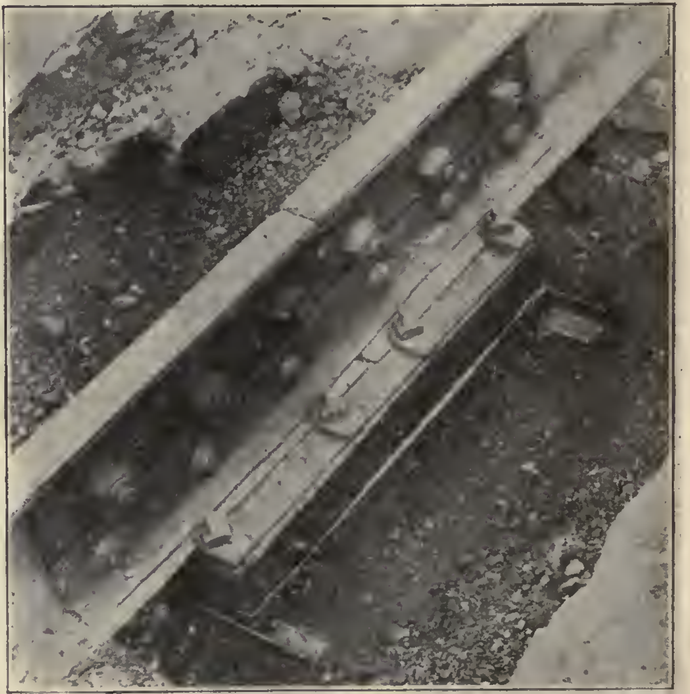
AFTER

$4.50

will buy this permanent cure for bad joints.

That temporary work you are doing now on your bad joints can be made permanent by adding the Dayton Resilient Joint Booster.

Your chief expense in shimming up a bad joint is taking out the old paving and replacing it. Why go to this expense for something only temporary? Add a Booster and make it permanent.



CURE

Installing Dayton Resilient Joint Booster

THE DAYTON MECHANICAL TIE CO., 704 COMMERCIAL BUILDING, DAYTON, OHIO

The RESILIENT RAILWAY TIE

Builds Track with no come Back

DMT Co DMT Co

Keystone Steel Gear Cases

"Riveted for Strength—Reinforced by Spot Welding"

Made in standard forms for practically all modern types of railway motors.

By experience it has been found that a rivet is strong in one direction and a spot weld in exactly the opposite — against slipping.

To secure the strongest possible construction Keystone cases are riveted and welded. Soft, open-hearth, special analysis steel of extra quality is used in the construction of these cases and breakage or tearing out of the sides is practically unknown.

Brackets are either steel or malleable iron castings or steel forgings and the manufacturing process and design of these cases insure maximum strength and service.

There is a lot more about them—
Write for data sheets

ELECTRIC SERVICE SUPPLIES CO.

Manufacturer of Railway Material and Electrical Supplies

PHILADELPHIA
17th and Cambria Streets

NEW YORK
50 Church Street

CHICAGO
Monadnock Building

Necessity's Understudy

USERS deserve equal credit with our Service Engineers for the constant development of new uses for Boyer Riveting Hammers and Little Giant Air and Electric Drills.

In one, two, three order, three typical uses developed through their close co-operation are—

A Boyer Riveting Hammer driving drift bolts with *one* man on a two-man job. This is proof of two things: labor-saving adaptability of the tool and ingenuity in applying it, both made possible by the *powerful* Boyer stroke.

A Little Giant Portable Electric Track Drill drilling truck chassis. Supplies its own "old man," and works *six* times as fast as the portable drill it replaced, with one man less.

A Little Giant Portable Electric Drill mounted on a buggy. Almost as fast as this man can raise and lower the buggy handles, this Little Giant countersinks—an average of *9½ holes a minute.* Think of it!

Conclusion: If Necessity is the Mother of Invention, C-P Engineers are her Understudy, working first-hand with users and constantly widening the already wide utility of C-P labor-saving tools. Ask for bulletins.

Chicago Pneumatic Tool Company

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BOYER PNEUMATIC HAMMERS · · LITTLE GIANT PNEUMATIC AND ELECTRIC TOOLS
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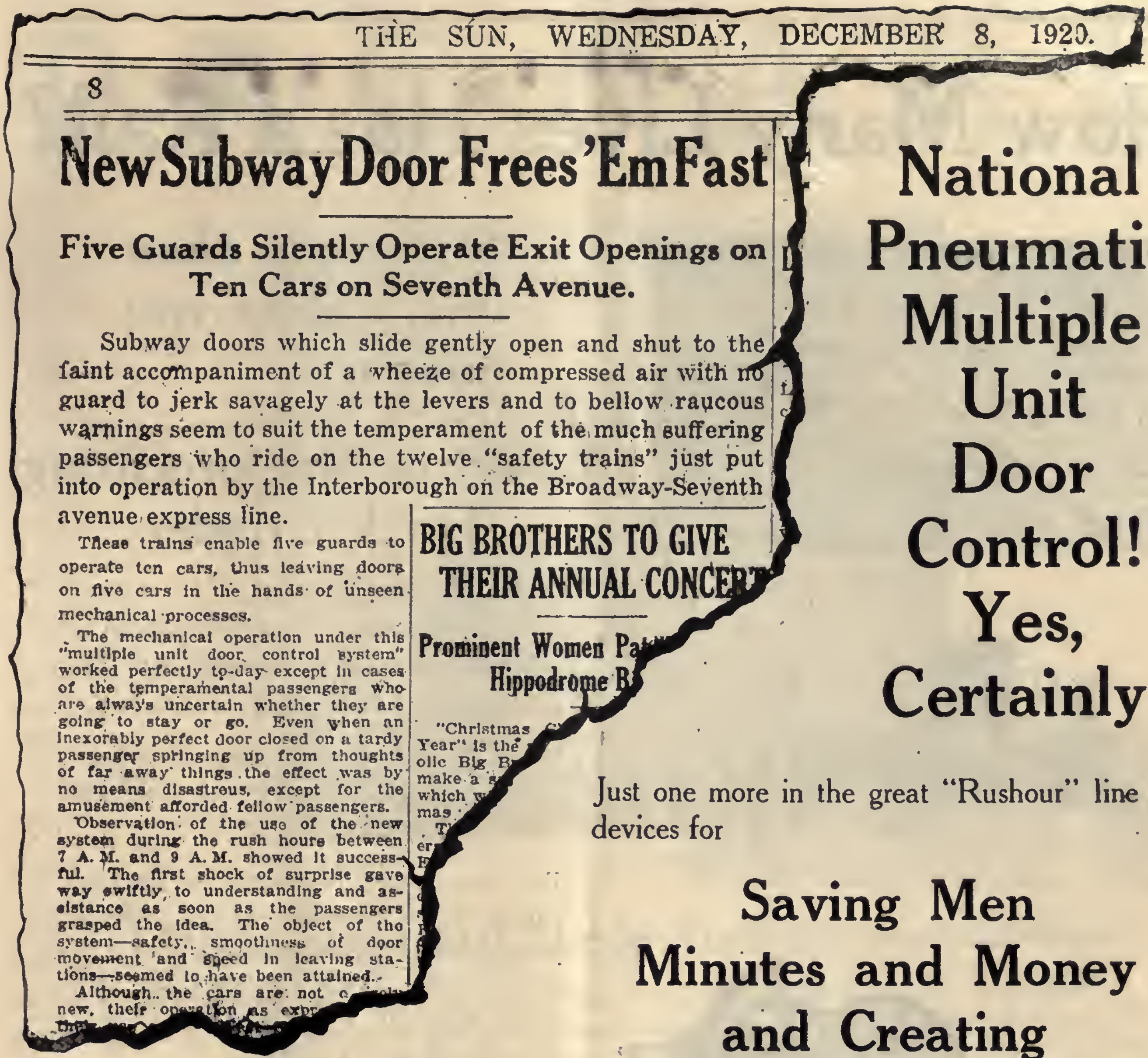
Depend upon that Name



THE SUN, WEDNESDAY, DECEMBER 8, 1920.

8

New Subway Door Frees 'Em Fast

Five Guards Silently Operate Exit Openings on Ten Cars on Seventh Avenue.

Subway doors which slide gently open and shut to the faint accompaniment of a wheeze of compressed air with no guard to jerk savagely at the levers and to bellow raucous warnings seem to suit the temperament of the much suffering passengers who ride on the twelve "safety trains" just put into operation by the Interborough on the Broadway-Seventh avenue express line.

These trains enable five guards to operate ten cars, thus leaving doors on five cars in the hands of unseen mechanical processes.

The mechanical operation under this "multiple unit door control system" worked perfectly to-day except in cases of the temperamental passengers who are always uncertain whether they are going to stay or go. Even when an inexorably perfect door closed on a tardy passenger springing up from thoughts of far away things the effect was by no means disastrous, except for the amusement afforded fellow passengers.

Observation of the use of the new system during the rush hours between 7 A. M. and 9 A. M. showed it successful. The first shock of surprise gave way swiftly to understanding and assistance as soon as the passengers grasped the idea. The object of the system—safety, smoothness of door movement and speed in leaving stations—seemed to have been attained.

Although the cars are not e
new, their operation as expr

BIG BROTHERS TO GIVE THEIR ANNUAL CONCER

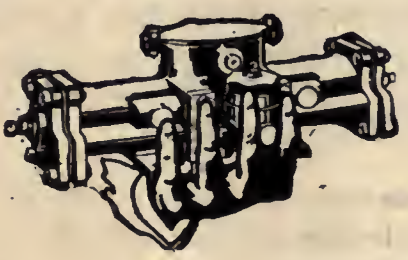
Prominent Women Pa
Hippodrome B

"Christmas
Year" is the
olic Big B
make a
which
mas

National Pneumatic Multiple Unit Door Control! Yes, Certainly.

Just one more in the great "Rushour" line of devices for

Saving Men Minutes and Money and Creating Good-will and Business



Ask us about any of 'em—Pneumatic Door and Step Control, Door and Step Operating Mechanisms, Motorman's Signal Lights, Safety Interlocking Door Control, Multiple Unit Door Control.

National Pneumatic

Door and Step Control Motorman's Signal Lights
Safety Interlocking Door Control

National Pneumatic Company, Inc.

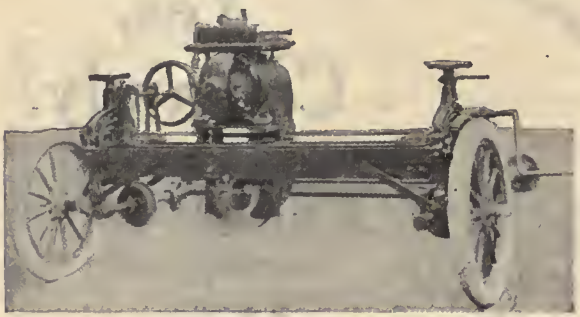
50 Church St., New York Edison Bldg., Chicago
Works: Rahway, N. J.

Manufactured in Canada by
Dominion Wheel & Foundries, Ltd., Toronto, Ont.

How Many Lives Has a Rail?

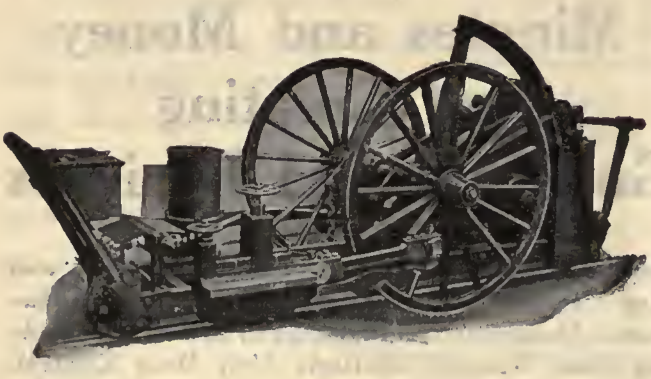
Not more than one, unless you have a

Rotary or Reciprocating Track Grinder



and then it has two, as hundreds of electric railways throughout the country can truthfully vouch for.

When cupping, corrugations or indentations capture your track, that's the end of the rail's first life.



But when taken out with the Reciprocating Track Grinder, or the built-up joints ground down by either the Atlas or Universal Track Grinders, the same rail is good for another life of 15 to 40 per cent of its first life.

Bad track conditions never cure themselves. They just keep on getting worse, unless they are taken in hand vigorously and given thorough treatment.

And the worse they get the more expensive they are to remedy when the remedy is eventually applied.

Your solution lies in the continued use of one of these three track grinders. Let us prove it to you.

Railway Track-work Co.

3132-48 East Thompson St., Philadelphia, Pa.

PACKARD

Dependable Auxiliaries in Express Service

Not alone as supply carriers for the trouble-shooters and construction gangs are Packard trucks serving the electric railways of the country with that reliability, dispatch and unusually low ton-mile cost for which they are everywhere noted.

They have proved, as well, dependable auxiliaries to interurban roads in the sure, speedy moving of freight and express shipments.

The Milwaukee Electric Railway and Light Company, for example, selected a fleet of Packard pneumatic-tired trucks to supplement its express service when the cost of construction prohibited the extension of lines.

These Packards have kept the routes open and the freight moving regularly, winter and summer. Regardless of weather and road conditions, they have provided that fast, continuous service so essential to motorized rural express.

The known ability of Packard trucks to do the most work at the lowest cost in all lines of industry is the direct result of expert engineering, painstaking manufacture, and scientific specification to the job.

PACKARD MOTOR CAR COMPANY • DETROIT

Ask the man who owns one

Equipment that pays for itself

Most any time or labor saving device "pays for itself" in time—if it doesn't wear out in the process.

But there's one time, money and labor saver that actually pays for itself in the first two or three months of operation. After that the extra revenue that it produces is sheer "velvet."

We're referring to Johnson Fare Boxes and make the above claim after carefully checking up on actual returns on more than 200 properties now using them.

As a matter of fact, you don't really pay for Johnson Fare Boxes at all. You merely advance the purchase price against the cash returns which begins the hour you place the boxes in operation.

You know what your gross revenue is today. Well, figure with certainty that Johnson Fare Boxes will increase that gross 3 to 10%. There you have the figures that will enable you to determine the startling dividends that Johnson Fare Boxes return on a small initial investment.

Our Engineering Department is anxious to supply you with further data. Write today and give us permission to do so.

JOHNSON FARE BOX COMPANY

Ravenswood, Chicago, Ill.

The World's best Lubricants

GALENA QUALITY

A five cent cigar
and
A gallon of oil

Picture a discriminating smoker choosing a cigar because of its size or the color of the band; there are many five-centers as large as the finest perfectos.

Likewise with lubricating oils — it is not the bulk, but the *quality*, that counts! The gallon measure is but the gauge of quantity, while quality —the real test of value—must be measured by the units of lubrication the gallon contains. Modern business efficiency establishes correct proportions that facts may be properly weighed and balanced. Railroads keep records of costs, of mileage and of materials used.

By these records—on the railroads of the North, South, East or West—the *Galena gallon* shows its quality value in lubrication units by ability to give much greater service than the gallon of the ordinary lubricant.

Galena Oils welcome the tests of actual service and stand on the open records of real performance figures, on the principle that no fairer standards can be used as measures of true worth and value.

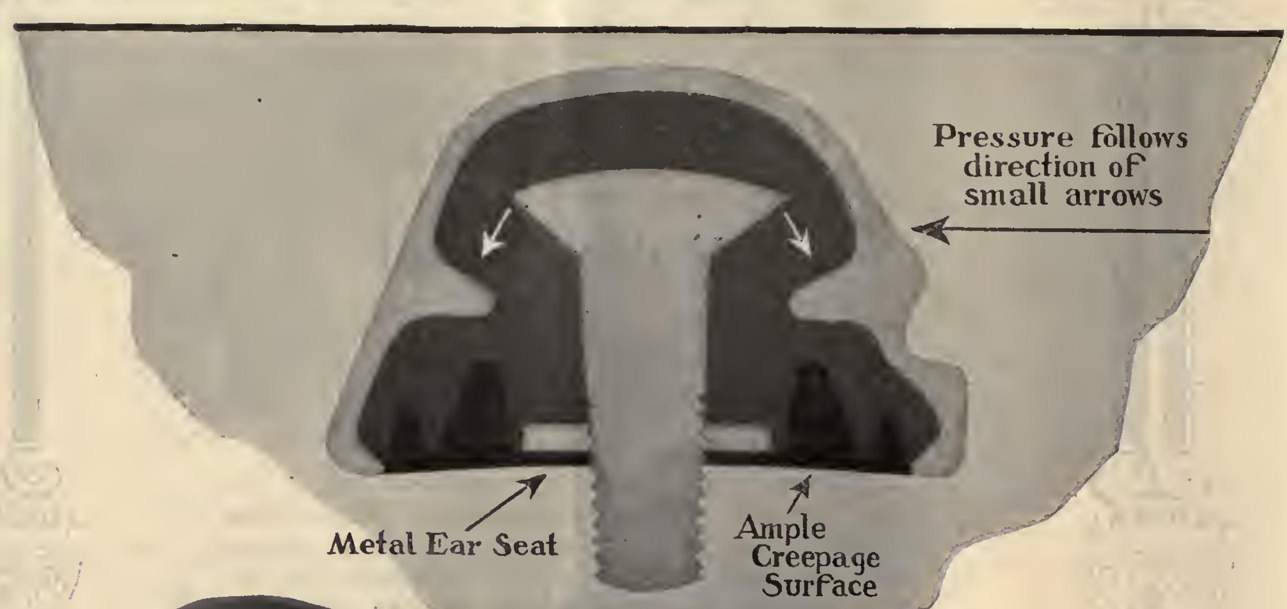
Buy Bulk and get Oil.
Buy Quality and get Lubrication.

TRIGRAM G S O C TRADE MARK

THE GALENA-SIGNAL OIL CO.
NEW YORK FRANKLIN, PA. CHICAGO
Offices in all principal American Cities
LONDON BUENOS AIRES PARIS

GALENA SERVICE

Durability is not alone a matter of quality of materials— details of construction have an even greater effect upon the life of a product.



The G-E Form H Hanger is designed to give maximum strength

When selecting a hanger for use in the overhead it pays to look closely into the inside construction.

Form H Hangers are built for long life — note the shape of the metal shell as shown in the cross section drawing above. The strain of supporting the trolley wire does not fall on unsupported moulded insulation; sturdy metal projections on the inside of the shell reinforce the compound making the strain one of compression — the bolt cannot pull out in service.

Note also the metal ear seat and ample creepage surface, other superior points of this hanger. The form H, as all other G-E line material, is sherardized by the G-E electric oven process giving positive protection against weathering.

Specify G-E Line Material for durability

General Electric Company

General Office
Schenectady, N.Y.

Sales Offices in
all large cities

40-137

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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Volume 57 New York, Saturday, January 22, 1921 *Number* 4

Cleveland Keeps Down Cost of Track Construction

IN THE issue of this paper for Jan. 8, 1920, the news columns carried an announcement of a 20 per cent cut on Jan. 1 in the wages of track laborers in Cleveland, together with a 15 per cent cut for shopmen to be made on Feb. 1. These are among the first, if not the first, substantial cuts in wages of track and shop men to be made in the electric railway industry. Other industries recently have been forced to cut wages or shut up shops, and in numerous instances employees of late have asked for wage cuts in preference to idleness.

Were it not for the gains in cost reductions incidental to the introduction of machinery in the track construction field it is doubtful whether the street railways could have borne even as well as they have the remarkable wage rise in track labor, not to speak of other labor. Something would have happened long ago. Reference need only be made to C. H. Clark's article in the issue of this paper for Feb. 21, 1920, in order to get a clear idea of the value of "machine-made" track as a means of keeping down costs.

The Cleveland wage cut may be taken as indicative of the arrival of the time when electric railways must fall in line with other industries and get back toward pre-war "normalcy" in their payroll costs if they expect to enter upon the road to financial recovery. Cleveland has also shown the way heretofore in adopting machinery to offset rising costs of track construction. With renewed efforts there may be expected still greater cost reductions through the use of more and better machinery, and the latter, combined with wage reductions, introduced as conditions warrant, should go a long way toward putting our utilities upon their feet.

Electric Railway Work Ought to Appeal to Young Engineers

WHILE construction is at a low ebb on electric railway properties at the moment, there is still presented a wealth of interesting problems of an engineering character. Assuming for the purpose of argument (and only for this purpose, mind you, for it isn't so) that the pay of engineers in this field is what it ought to be, it will be worth while to consider the attractions other than financial of the electric railway field for this class of trained men. Electric railway transportation will always rest on a civil-mechanical-electrical engineering foundation. It must do so as long as rolling-stock moves over track structure, impelled by power mechanically produced and electrically transmitted.

One might conclude that by this time all of the essential electric railway engineering problems had been solved. Far from it! New ideas in car design, track structure, paving, shop practice, power generation, power transmission, etc., are being evolved now as vigorously as ever, although not in such sensational fashion as of yore. This means that fresh engineering talent must be enlisted. Money is scarce in this field, of course, but this fact is in itself a challenge to the real engineer, whose function and joy it is to produce results promptly with the facilities that he can get. Any fool can get results if he has funds and time enough.

Finally, engineering can be the stepping stone to administrative position, if the engineer is gifted with the proper qualities. An increasing number of superintendents, managers and better are fundamentally engineers. May their tribe increase!

Swat the Swindler and Save the People's Money

THE week that concludes today has been called Franklin week because it was hoped thereby to revive interest in the homely but wise maxims on the desirability of thrift, long associated with the name of Benjamin Franklin. The proverbs of Poor Richard are especially worth remembering today when the world is endeavoring to recover from the most severe upset in its history and when on each member of society there rests the duty of repairing so far as he can the havoc wrought by war.

But the thrift movement means more than simply to save money. It includes also the wise investment of the amounts saved, and the need for intelligence in investment is shown by the recent estimate that $250,000,000 is lost by the public each year in bogus stock schemes. By a coincidence this sum just about equals the requirements of the electric roads in 1921 for refunding their maturing obligations.

It is a sad commentary on the gullibility of human nature that fraudulent schemers can get money where legitimate enterprises cannot secure it, or can secure it only with great difficulty. This leads up to the questions (1) how can this stream of investment be turned into legitimate channels and (2) how much of it could be attracted to investment in utilities. If the present thrift movement is at all extended the sum thus to be protected from fraudulent promoters will be considerably more than $250,000,000.

As for the first question, education and more rigorous prosecution of the swindlers are the best answers. Most states now have blue sky laws as a basis for prosecution. Education on the fundamental principles of investment should also be conducted, and here the local banks and such organizations as the Y. M. C. A. and even the public schools could help. In such national movements no particular form of permanent investment could be singled out as being preferable. Nevertheless, while the utilities would indirectly profit by any increase in investment funds, their securities would probably often be chosen for investments of the kind under consideration. For this purpose they have the advantage that they are a well-known form of corporation whose property is visible, that they supply a necessity and that their finances and capitalization are supervised to a considerable extent by the state. Moreover, at present interest rates their securities can be offered at very attractive prices. The return may not be as high as that promised by fraudulent promoters who have no intention of paying back anything, but it is sufficient, especially in view of the probability of increases in security prices, to constitute a "real bargain."

Some utilities, especially among the lighting companies, have been successful in selling stock, usually preferred stock, over the counter, and it is hoped that others will do the same. Such securities will have to be well advertised and put out in such denominations as will appeal to the small investor. Some electric railways may think that a plan of this kind for selling securities is not dignified, but they must bear in mind that they are endeavoring to reach a different class of security holder than in the past. They have a good thing, and they ought to know how to sell it.

Indiana Utilities Unite for Common Task

REPRESENTATIVES from all classes of public utilities in Indiana gathered in Indianapolis on Jan. 13 for the first annual meeting of the Indiana Public Utilities Association. This association was formed a year ago to finance and sponsor the Indiana Committee on Public Utility Information as a means of promoting better public relations. The meeting just held was simply an expansion of this original object, for it has been realized that much remains to be done in educating the utility operators themselves in the necessity for educating the public, and in how to go about it.

Planned with this object in view, the first meeting proved to be a splendid success. The attendance was large and the addresses pertinent and very interesting. Many utility operators went back home with a new conception of their obligations to the public, a fuller realization of why the public has not understood them and a better understanding of what activities and policies hold promise of restoring lost confidence. The result of this awakening of all classes of utilities to their common task should be a considerable uplifting of the public relations situation in Indiana during the next year.

One of the outstanding addresses of the meeting was that by E. K. Hall, a prominent telephone man. It appears in part elsewhere in this issue. Significant among his thoughts were these:

The utilities have only recently come to realize that it is service they are selling and not telephone instruments, lamps, etc. The mistakes made during the development of the art have been corrected and fully atoned for. With this done, the public should be interested now in making and keeping the utilities strong enough to do their job; in other words, we are ready to enter the second era of regulation. The only thing against which the public now needs to guard is too low rates. Within the fraternity it is the duty of the utilities to take to task any utility company not playing fair and square with the public. Every company must first be deserving of sympathetic consideration before seeking favorable public opinion. But deserving this, it is the duty of the utilities to expose crank politicians who do not represent the will of the people when they deride the utilities. And finally, utility men should stop sobbing and apologizing and should actively take the offensive.

A Cheering Example of Co-operation in New Jersey

THE action of the platform men of the Public Service Railway in initiating a proposition to help the company in meeting the present crisis is worthy of more than passing notice. What the men did was explained briefly in last week's issue of this paper. In a word, they proposed that their basic day be ten hours with relief for meals, in place of nine hours without relief, and that the schedules be so arranged as to minimize idle time. The net result to the company is that more employees are available to man cars during the rush hours when they are most needed and that overtime pay is minimized. As for the men, a few of them receive less overtime wages, but the pay is more uniform for actual platform work. Incidentally but very important is the fact that by their voluntary action, taken as a union local, the men showed a fine desire to help the company management solve the jitney and other pressing problems now confronting it.

An understanding of the background of the Public Service Railway labor situation is necessary to a proper appraisal of the present pleasant incident. To go way back before the war, it will be remembered that the relations of men and management on this property were then very satisfactory. There was a large proportion of "veterans" among the men and the whole force was on amicable terms with the men higher up.

Then came the cataclysm of 1917 with its demand on the country's citizenry for men for war service. This demand took 75 per cent of the Public Service platform men, naturally those most virile and vigorous. The men who remained were loyal but, by virtue of their age, less aggressive. New recruits were secured, but many were irresponsible and transient; the annual turnover reached 200 per cent or more. The new men were naturally not acquainted with the traditions of the company and included some agitators. Together they overwhelmed the veterans; they secured the backing of the National War Labor Board in unionizing the property and there was a short strike.

But that was nearly three years ago and largely the outcome of conditions brought about by the war. The time intervening since the signing of the armistice has been employed by men and managers in developing a mutual understanding. The older men held the leadership in the union from the start, but for a time they were outvoted by the newcomers, who had no conception of the job of railroading. Gradually the more experienced men came into their rightful control and the newcomers settled down really to learning the business.

In the meantime the jitney menace became a reality. The men came to realize that their occupation, the duties of which they like and the stability of which they appreciate, was threatened by this competition. This conviction plus the gradual restoration of normal working conditions on the property impelled the recent action. And the other employees of the company have shown the same spirit. The shopmen voluntarily reduced their piecework rates some weeks ago and the supervisors added an hour to their day's work without compulsion.

The crux of this whole matter of intra-company relations is a mutual spirit of sympathy. Companies as such cannot be sympathetic, but managers and men can. It is only by honest regard by each for the other's welfare that collective bargaining can succeed. Before the war Public Service was a property where informal bargaining was the means of settling impending disagreements.

Superintendents and managers were in close touch with the men and appreciated their point of view. Such relations take time for development; as was previously explained, the war completely upset them in this case. They are now happily being restored, and the union local is taking a lot of the responsibility for restoring them.

Chicago's $180,000 Traction Report a Political Document

ANOTHER commission report on Chicago's local transportation problem is a matter of history. For an expenditure of $180,000, the people of Chicago have received a fifty-page report which assures his Honor the Mayor that his plan for "people's ownership and 5-cent fares" is not only feasible and practical but necessary as the only solution of the tangle, and contains a draft of the enabling legislation necessary before people's ownership can be had. The writing of this proposed law probably would require two or three days' time of an able lawyer, but aside from that the report as presented to the City Council could have been written with equal value in a half day's time by any good newspaper reporter who knew the Mayor's wishes and was willing to give him *carte blanche*. True, an engineering staff was organized and it accumulated a great mass of information, plans and data, but its value is doubtful, for the commissioners decided (after spending a good portion of the $180,000 total for engineering expense) that they would omit from their report "this non-essential mass of detail." And in another place the report informs the reader that the commissioners "have borne in mind that the building of a new system of transportation . . . will of necessity be an evolution in practice rather than a theoretical creation," and furthermore that "it will be for the trustees [of the proposed Transportation District] to determine what is the best at that time and to build their system accordingly."

Having thus disposed of the work done by the large engineering staff as of no consequence now and of no value in future to the new trustees, who must be left free to work out their own system, the earlier statement that the report could have been written in a few hours and for a few dollars is explained.

While the commission seems very ready to tell the Mayor that a 5-cent fare will pay operating expenses and all charges, the proposed act gives the Transportation District power to levy taxes to pay interest and maturities on bonds and any deficit between earnings and operating expenses. The assistant office boy in the Mayor's outer office could have told the Mayor that he can have 5-cent fares if he will pay the deficit out of taxes, and it wouldn't cost $180,000 to get this information. Other interesting provisions of the proposed act are that all property, real and personal, of the district would be free from taxation and that the acts of the trustees shall not be subject to review by any agency of the State government. Of course the elimination of taxes, which amount now to 0.256 cent for each fare collected, would help a very little toward the 5-cent fare, but the same little scheme would deprive the city of the tax income from one of its largest contributors. But even with taxes removed and the other vast economies which the commission's engineer suggests, we wonder if the people will not understand that the plan must mean a considerable jump in taxes, not only to make up the tax income lost from the traction properties, but to make up the deficit in cost of a ride above 5 cents, when it is known that wages and materials alone now cost 5.78 cents per passenger carried.

Nevertheless the new Governor of Illinois, true to his election pledges, has recommended in his inaugural address that the State Public Utilities Commission be abolished, that the enabling legislation for Mayor Thompson's plan be passed and that "home rule" be reverted to in all cities. It remains to be seen if the success of the Thompson machine can be made to include control of the State legislature.

Service Below Cost Is Injurious to City in Long Run

MOST cities in this country have reached the conclusion that one of the essential factors in civic prosperity and the comfort of the public is a transportation system which is in good operating and financial condition. Unfortunately for the city of New York, it is not one of these, and the facts in the case do not seem to be understood even by all those who should realize them. The two arguments against an increase in fare most frequently heard in New York are, first, that prices are now falling and the present fare will be adequate before long if not now. The second is that the present fare is specified in the franchise of certain companies, notably the rapid transit companies, and "a contract is a contract" and should be lived up to by the companies.

President Hedley of the Interborough Rapid Transit Company effectually disposes of both of these arguments in a letter recently addressed to the New York *Tribune*, to which these arguments seemed to appeal. This reply points out, in regard to the first point, that there is no immediate opportunity for the company to make any material reduction in either wages, which amount to more than 67 per cent of the company's expenses, or in the cost of coal, which accounts for 15 per cent of the expenses. As to the second point, the fact is clearly brought out that the existing crisis in transportation affairs is clearly one in which the city is or should be as keenly concerned as the company. This is true not only because the city has $250,000,000 invested in the present subways, but it needs now and will need still more in the early future increased rapid transit facilities. Based then purely on the ground of self-interest, the city is or ought to be anxious to have its local transportation system conducted on a business basis, and by solvent companies. The announcement by the company that it will accept a flexible fare based on the cost of service ought to make relief by the city easy.

Quotation from the Federal Electric Railways Commission Report

No. 4

THE necessity for scientific and successful regulation of systems, whether large or small, and especially those which operate through several cities and villages and in rural territory, leads to the conclusion that local regulation should generally be subject to the superior authority of the state, whether as a matter of original jurisdiction or through the medium of appeal.

Two-Car Trains in Washington

Old Open Cars Are Being Converted Into Trailers for Train Operation—Extensive Power Consumption Studies Indicate a Low Cost of Trailer Operation—To Adapt Two-Car Train to Operate on Stub-End Lines, Trailer Is Equipped with Controller and Plow—Fifty Trailers Now Being Converted for This Purpose

NEWLY CONSTRUCTED TRAILER COUPLED TO MOTOR CAR IN OPERATION

WITH a view to taking advantage of any economies of operation which might accrue from two-car train operation, the Washington Railway & Electric Company is now converting some fifty old open car bodies into closed cars for use as trailers. Before the reconstruction program had progressed very far full studies were made of the comparative power consumption of operating a motor car alone and a motor car with trailer to see what economies actually would be realized.

The reconstruction job is proving extremely satisfactory. Four of the cars have been converted at the present time and are now being used as trailers. The construction has been so arranged, however, that these converted cars can be used as motor cars when necessary equipment has been added. The original equipment of these open cars was removed a few years ago and transferred to closed cars during the winter season, for when these cars were used in service the company did not have a complete equipment for both summer and winter operation and was in the habit of exchanging equipment between cars. These open cars have not, therefore, been in service for several years.

In the reconstruction work the car bodies are stripped of seats, steps, grab handles, vestibule hoods and dashes. The center sills are cut back to the bulkhead posts and the side sills are cut off at the corner posts. New end sills reinforced by steel plates are mortised in and tiebars are installed to distribute the drawbar strains and add strength to the corners of the body. The side sill is further strengthened by an overtruss, which extends at each end through the steel side sill and is supported by two queen posts, which rest on the ends of bolsters.

In order to provide for side sash and to support the letterboard the lower portion of the side sills where the old seat ends were fastened is filled up with a yellow pine furring strip. On the outside of the post a false post 1½ in. thick, also of yellow pine, is bolted so as to extend up over the old letterboard. This post is cut to receive an ash beltrail, the posts extending over the letterboard form pockets, into which the side sash can be raised. The new letterboard is fastened to the upper portion of the post and the lower deck is extended out to meet it. The whole is covered with No. 8 duck. The old car bodies had a stationary seat at each end and there was a wide opening at these points. In order to make all sash the same size an extra post is installed and the narrow space which is left is paneled with sheet steel. The new platforms are of different lengths and the contour of the car body roof has been changed, so it is not possible to use the old hood.

A new car floor was laid over the old one under the seats, and in the center aisle maple floor strips were screwed to the old floor. New maple flooring was installed in the vestibules, with Mason safety treads on the steps and end sill.

The car has two door openings at diagonally opposite corners. Each opening is equipped with double folding doors and folding steps operated by pneumatic door engines mounted overhead. In operation the leading end is used for both entrance and exit. The reconstructed cars have a seating capacity of forty-four. The cars are equipped with Heywood Brothers & Wakefield seats, Holden & White-Cutler-Hammer type car heaters, O. M. Edwards sash locks, Brill ventilator openers, Brill vertical wheel hand brakes with Peacock drums, Electric Service Supply Company's light fixtures with opalescent shades, Pantasote curtains, Tomlinson couplers with air connection, Westinghouse Traction Brake Company's type S. M. E. air equipment and National Pneumatic motorman's signal door lights and conductor's single stroke bell.

The car body is painted on the outside with the company's standard green with aluminum stripes and letters and the inside in cherry. The headlining is of agasote.

This reconstruction work is being done in the shops of the company under the direct supervision of R. D. Voshall, master mechanic.

One of these reconstructed cars, No. 1071, ready to use as a trailer, was used with motor car No. 749 as a train. The motor car was equipped with an Economy electric meter and the power consumption measured for each trip both with trailer and without, the motor car or train, as the case may have been, being operated in regular service.

Previous to June 29, 1920, the train was operated on a schedule calling for two morning and two afternoon trips, arranged as follows:

Leave East Capitol barn,	7:28 a.m.	Leave Fourteenth and F,	7:49 a.m.
Leave East Capitol barn,	8:17 a.m.	Leave Fourteenth and F,	8:37 a.m.
Leave East Capitol barn,	2:44 p.m.	Leave Georgetown,	3:25 p.m.
Leave East Capitol barn,	4:28 p.m.	Leave Georgetown,	5:11 p.m.
Saturday:			
Leave East Capitol barn,	7:28 a.m.	Leave Fourteenth and F,	7:49 a.m.
Leave East Capitol barn,	8:17 a.m.	Leave Fourteenth and F,	8:37 a.m.
Leave East Capitol barn,	1:02 p.m.	Leave Georgetown,	1:46 p.m.

Beginning June 30 a new schedule was put into effect, as follows:

Leave East Capitol barn,	7:48 a.m.	Leave Georgetown,	8:30 a.m.
Leave East Capitol barn,	3:36 p.m.	Leave Georgetown,	4:20 p.m.
Leave East Capitol barn,	5:16 p.m.	Leave Georgetown,	6:00 p.m.
Saturday:			
Leave East Capitol barn,	7:48 a.m.	Leave Georgetown,	8:30 a.m.
Leave East Capitol barn,	1:05 p.m.	Leave Georgetown,	1:46 p.m.

OLD OPEN FIFTEEN-BENCH CAR

Beginning July 15 a new schedule was put into effect, as follows:

Leave East Capitol barn,	7:40 a.m.	Leave Georgetown,	8:23 a.m.
Leave East Capitol barn,	3:11 p.m.	Leave Georgetown,	3:52 p.m.
Leave East Capitol barn,	4:52 p.m.	Leave Georgetown,	5:40 p.m.
Saturday:			
Leave East Capitol barn,	7:40 a.m.	Leave Georgetown,	8:23 a.m
Leave East Capitol barn,	12:22 p.m.	Leave Georgetown,	1:04 p.m

The train does not run Sundays or holidays.

From the manifests for the dates corresponding to the days on which energy measurements were made the number of passengers carried and the cash value of receipts were calculated for each trip and each day. The number of platform-hours with the corresponding cash value was also computed for each trip and day.

The cost of power consumption in the following analysis was based on a unit price of $.00666 per kilowatt-hour.* From costs of maintenance of equipment of motor cars and trailers, taken from company records, a ratio of maintenance of trailers to motor cars of 25 per cent was used. The cost of maintenance of equipment of motor cars was figured at $0.0475 per car-mile.

From the power measurements and the calculations based on the figures given, the analysis of power con-

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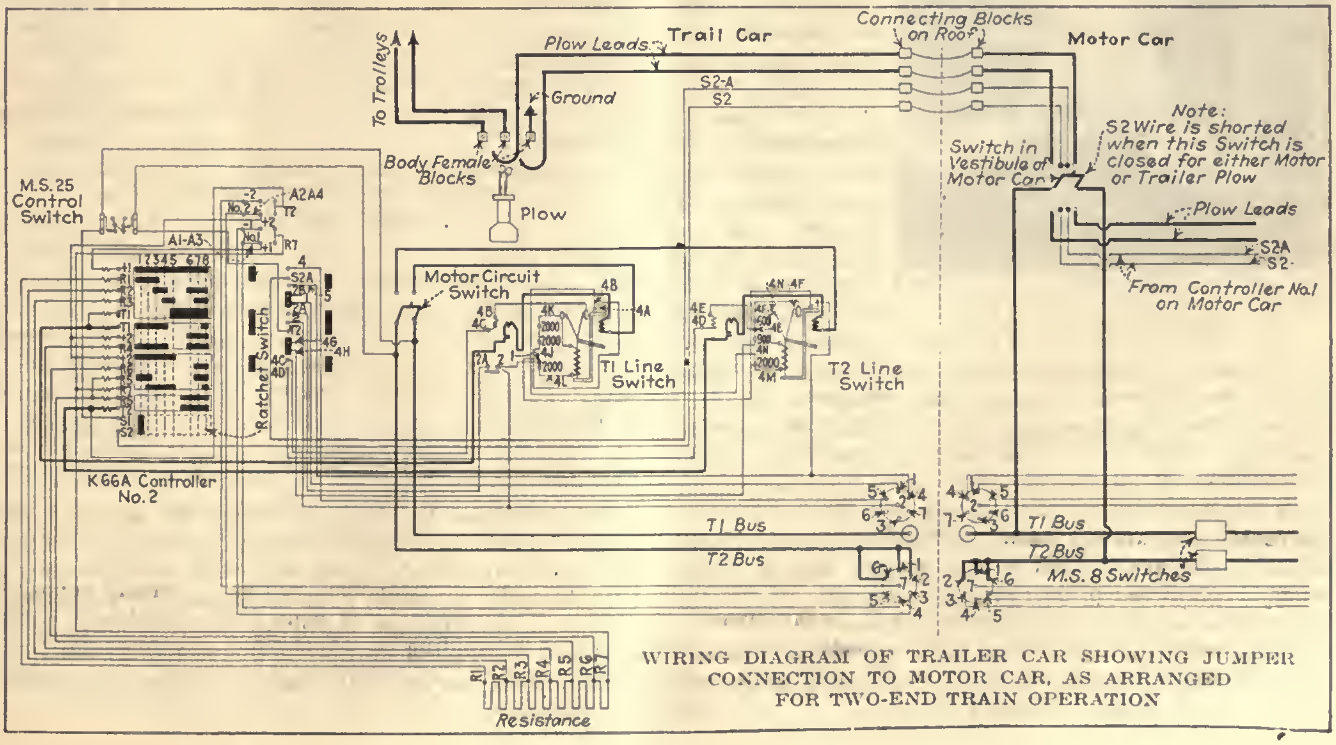
*The present cost is more nearly $.008 per kilowatt-hour.



WIRING DIAGRAM OF TRAILER CAR SHOWING JUMPER CONNECTION TO MOTOR CAR, AS ARRANGED FOR TWO-END TRAIN OPERATION sumption and costs was obtained as shown in the accompanying table.

Reduced to a percentage basis, it is thus found that the cost of operating the trailer is 42 per cent of the cost of operating the motor, and of the total cost of the train operation 30 per cent only is chargeable to the trailer. These figures bring the cost of transportation by trailer approximately equal to that of a light one-man safety car.

Kilowatt-hour per car-mile:						
Morning trip	motor	4.65	trailer	0.95	train	5.60
Afternoon trips	motor	3.50	trailer	1.15	train	4.65
Platform expense per car-mile operated:						
Morning trip	motor	$0.184	trailer	$0.092	train	$0.276
Afternoon trip	motor	.20	trailer	.10	train	.30
Maintenance of equipment expense per mile operated:						
Morning trip	motor	$0.0475	trailer	$0.012	train	$0.0595
Afternoon trip	motor	.0475	trailer	.012	train	.0595
Cost of the trips as operated, divided into:						
Power—Morning	motor	$0.38	trailer	$0.08	train	$0.46
Afternoon	motor	.29	trailer	.09	train	.38
Platform—Morning	motor	2.25	trailer	1.13	train	3.38
Afternoon	motor	2.43	trailer	1.22	train	3.65
Equipment—Morning	motor	.58	trailer	.15	train	.73
Afternoon	motor	.58	trailer	.15	train	.73
Total cost of operation:						
Morning trips	motor	$3.21	trailer	$1.36	train	$4.57
Afternoon trips	motor	3.30	trailer	1.46	train	4.76

The cost per car-mile of maintenance of way and structures and general overhead expense was not considered in the analysis, as these figures would not be affected by the operation of a limited number of trains.

An analysis was also made of revenue by trips and by days and also the number of passengers carried, and from this it was found that some of the trips prior to June 30 were not earning operating expenses, but that after the change in schedule on June 30 the train was much better placed with regard to traffic and made a better showing on the relation of revenue to operating expense. Specifications of the motor car and trailer, as to weight and dimensions, are given in a table in order that the energy requirements may be better analyzed. As a result of these energy measurements it was recommended to the management that the most economical method of handling rush hour traffic is by train and that the train should be composed of but one motor car and one trailer, rather than two motor cars. It was emphasized that a very important point is the placing of the trains on the right schedules to obtain the best results and that each trip should be analyzed to see that that particular trip on the schedule is accomplishing desired results.

JUMPERS ON TRAIN ARRANGED FOR TWO-END OPERATION

These energy studies were made by M. G. Stratton, former efficiency engineer of the company, now general manager Washington-Virginia Railway.

There were also some lines of the company on which the operation of a two-car train seemed justified, from the traffic standpoint, but which were stub end and therefore not conveniently arranged for train operation. It occurred to some of those interested in the studies that the trailer might be equipped with a controller and plow so that the train could be operated from either end. This equipment has been placed on one of the trains and this train has been under operation for the purpose of making a study as to its practicability or desirability. It was found necessary to equip the trailer with a plow rather than to use the plow of the motor car on account of the obvious difficulties which would otherwise be encountered in the operation of electric track switches. This also made necessary an arrangement for switching from one plow to the other, depending on which controller was to be used.

VIEW SHOWING LOCATION OF SWITCH TO CUT FROM ONE PLOW TO THE OTHER

SPECIFICATIONS OF MOTOR CAR NO. 749, PAY WITHIN, KUHLMAN CAR COMPANY

Over-all length	43 ft. 11½ in.
Width	8 ft. 7½ in.
Height	11 ft. 11½ in.
Inside length	42 ft.
Inside height	8 ft. ½ in.
Seating capacity	48
Motor equipment	4 G.E., 200 K motors
Control equipment	K 66 A
Truck	Brill 76 E
Wheelbase	4 ft. 10 in.
Truck centers	20 ft. 2½ in.
Wheel diameter	31 in.
Gear ratio	14 to 67
Weight of two trucks	12,300 lb.
Weight of four motors	8,960 lb.
Weight of car body	24,540 lb.
Total weight	45,800 lb.

SPECIFICATIONS OF TRAILER NO. 1,071, PAY WITHIN, RECONSTRUCTED FROM NARRAGANSETT TYPE FIFTEEN-BENCH OPEN CAR

Over-all length	44 ft. 1 in.
Width	8 ft. 4 in.
Height	11 ft. 6½ in.
Inside length	42 ft. 4 in.
Inside height	8 ft. 2 in.
Seating capacity	44
Truck	Peckham 14B3
Wheelbase	4 ft. 6 in.
Wheel diameter	30 in.
Weight of two trucks	12,000
Weight car body	Approximately 22,000
Weight of one motor*	2,850
Total weight	Approximately 36,850

* One Westinghouse motor No. 306 was left on these open cars for moving it around the carhouse.

An accompanying diagram shows the wiring layout to accomplish the switching from one plow to another. This cut-over switch is placed on the rear platform of the motor car, as shown in an accompanying photograph.

The entire program, involving the rebuilding of the cars and the train operation on the system, is under the general direction of J. H. Stephens, superintendent of the company.

This Is the First of a Series of Articles on the Report of the Federal Electric Railways Commission, Written by a Commissioner

Underlying Principles of Public Service

This Is Best Obtained Under the Service-at-Cost Plan, Whose Natural Result Is to Establish Co-operation and Remove Antagonism Between the City and Operating Company—It Also Permits Utilities Safely to Become Monopolies and Reduces the Reasons for Labor Difficulties, Thus Making Continuous Service More Certain

BY EDWIN F. SWEET
Assistant Secretary Department of Commerce, Washington, D. C., and Member Federal Electric Railways Commission

THE investigation of the street railway situation made by the Federal Electric Railways Commission brought out many interesting facts concerning the industry and its relations to the public.

The commission was composed of eight men of divergent interests, and the fact that they were able to reach a unanimous agreement after considering testimony covering more than 6,000 pages of typewritten matter is not only noteworthy in itself but is gratifying evidence of their own fair-mindedness and the probable correctness of their conclusions.

Their report, covering about thirty pages of ordinary book size, can be read in an hour. Any one can obtain a copy of it at nominal cost by addressing a letter to the Superintendent of Documents, Government Printing Office, Washington, D. C. It is to be hoped that the desire expressed by the President for its wide circulation may be fully realized.

EDWIN F. SWEET

PUBLIC SERVICE—NOT PRIVATE PROFIT—THE AIM

The features of the investigation which impressed me as the most important are, first, that the principle underlying the street railway industry and all other public utilities should be public service and not private profit. This sounds like a truism. Almost any one would say, "Of course," yet it is an astounding fact that heretofore and for the most part at the present time service to the public has been and is subordinated to the pecuniary interests of the corporations owning and operating the street railways.

The service-at-cost plan recommended by the commission permits a fair return to invested capital and just compensation to labor, but provides for public regulation and stresses the point that the primary purpose is to serve the public.

The second feature of the committee's report which impresses me is the absurdity of the uniform 5-cent franchise or any other fixed fare which takes no account of the varying costs of labor and material or the changing financial conditions affecting credits and the acquisition of funds for extensions and improvements. Manifestly no industry can thrive without freedom to adjust the price of the commodity it sells to the cost of production.

The evidence also shows that the cost of operating a street railway is not exactly the same in any two cities; in fact there are differences so wide that it costs nearly twice as much in some cities as in others. This is a further impeachment of the universal 5-cent franchise.

The establishment of co-operation and the removal of antagonism between the city and the operating company, bred by the obsolete private profit plan, seem to me of especial importance and to be the natural outgrowth of the service-at-cost method of operating street railways in the public interest.

Another point of importance which has apparently escaped observation in the past is the fact that paving between the tracks and all other burdens imposed upon the street railway companies can only be paid for out of the fares received from car riders, and in the final analysis, under proper public regulation, these burdens are borne by the car rider while the general public and especially automobile riders are the chief beneficiaries. Broadly speaking, it is a tax upon the poor for the benefit of the rich and ignores the plain principle that sound public policy demands the efficient operation of street railways at the lowest possible cost to those who cannot afford conveyances of their own and must depend upon the street cars to get from place to place.

Another feature of the report which deserves especial attention is the importance of the square deal to labor, not only because it is right but because it makes for courteous treatment, safety and satisfactory service.

MONOPOLIES MAY BE MADE SAFE

The report of the commission makes no mention of the importance of restricting the street railway service of a city to a single company. With the public regulation contemplated in the service-at-cost plan, every public utility may safely be a monopoly. One street railway company, one telephone company, one lighting company and a single water supply can render better service at less cost than two or more competing companies. Testimony respecting the city of Washington clearly demonstrated this fact. One of the Washington companies appeared to be doing very well on a 5-cent fare, the other urged and probably needed an increase. This presented a practical difficulty which was solved by granting an increase to both. One of the chief reasons given for the financial straits of the less prosperous company was the extension of its lines into unprofitable suburban territory.

This brought to the attention of the commission the fact that in many cities the car rider is penalized by having to pay a somewhat higher fare because of non-paying extensions made at the instance of comparatively few suburbanites or speculators in real estate, and in all such cases it is the opinion of the commission that the expense should be borne by those who profit by it in proportion to the benefits received and not added to the valuation of the property upon which a return is to be allowed, which must come cut of the pockets of car riders.

SERVICE SHOULD BE CONTINUOUS

The last pcint in the report of the commission to which I call attention as especially important is the opinion expressed with regard to strikes and lockouts.

It is of vital importance to the entire community that street railway service should be continuous. As the report puts it, "It is intolerable that the transportation service of a city should be subject to occasional paralysis." If labor disputes cannot be settled by conferences between the managers of the street railway company and the employees, there should be resort to arbitration, and the decision of the arbitrators should be final and binding upon both of these parties.

This recognizes the principle that the primary purpose of street railways is not to afford opportunity for the investment of capital and not to provide work for employees, but for the benefit of the public, whose interest is paramount.

President Gadsden Sounds Optimistic Note

In a Statement Issued to the Daily Press, Association President Shows that the Electric Railway Industry Is Making Steady Approach to a Stable Basis—Shows that the Public, Both Car Riders and Official Regulatory Commissions, Are Taking Real Interest in Rehabilitation

RIGHT in line with the statistical information given, and the general trend and outlook of the industry interpreted and portrayed in the Jan. 1 issue of the ELECTRIC RAILWAY JOURNAL, President Gadsden of the American Electric Railway Association has just issued, for publication in the daily press, an official statement of the national condition of the Electric Railway industry, which shows the industry to be returning to stable conditions. This word of optimism coming from the leading figure in the electric railway field today is an encouraging sign.

His statement follows:

PHILIP H. GADSDEN

An official report on the national condition of the electric railway industry for the year ending January 1, 1921, just compiled by the American Electric Railway Association indicates a gradual and steady approach to a stable basis.

This situation is largely due to the fact that regulatory bodies, recognizing that granting of the claims of electric railways for fair rates of return is essential to the maintenance of good service, have steadily ordered relief throughout the country.

These regulatory bodies also seem to be cognizant of the fact that rehabilitation of lines will be a slow process and that at least the present advanced rates must be maintained for some time even if falling costs, anticipated but not realized as yet, should come. A large majority of the companies in the last four years have strained their financial resources to the limit, or created actual deficits, by merely meeting current expenses and making absolutely unavoidable emergency improvements. Many badly needed improvements have been deferred by virtually every company on account of a lack of funds. It is necessary, therefore, now that fares are beginning to be commensurate with costs, that the present increased rates be continued until lines are fully rehabilitated. Unless present fares are maintained, indefinite suspension of extensions and betterments will result, and this would be almost fatal to many properties.

The report just completed shows that 548 cities in the United States, representing more than 90 per cent of the riding public, are paying fares ranging from 5 cents with a 1 cent transfer charge to a flat rate of 10 cents.

The largest groups are: Cities paying a 10 cent fare, 112; 8 cent fare, 6; 7 cent fare, 174; and 6 cent fare, 124.

Other groups follow: Cities paying a 9 cent cash fare, 6; 7 cent fare, 1 cent transfer, 26; 7 cent zone fare, 8; 6 cent city and outside zone fare with 2 cent transfer charge, 10; 6 cent zones, 5; two 5 cent zones, 2; 5 cent city zone, 5 cent outside, 10; 5 cent city zone, 1 cent charge for rides outside city zone, 1; 5 cent fare, with additional charge for transfers, 4.

The immediate result of the widespread inclination to adjust rates upward to the requirements of good service is found in the low number of electric railway receiverships for the year 1920.

There were only 16, representing a total capital stock of $25,313,655, as compared with 48 receiverships, representing a capital stock of $221,259,354, in 1919. During the year 450 miles of track were dismantled and 308 miles of track abandoned.

Another encouraging sign is found in the general public interest in the welfare of electric railways. From every part of the United States reports have reached the association that not only are regulatory bodies but car riders generally taking the greatest interest in the restoration of companies to a healthy state. In practically every community there appears to be a desire on the part of the car riders to cooperate in an effort to make the lines self-sustaining and to encourage a flow of new money into the industry. Certainly the inclination to prevent companies from receiving sufficient return to maintain good service is confined to a small number of persons.

A.I.E.E. and W.S.E. Discuss Safety Cars

Three-Truck Trains Constructed in Milwaukee from Old Equipment Were Described and Their Advantages and Disadvantages Pointed Out—Results of Safety Car Operation in Waukegan, Ill., Shown to Be Very Gratifying —Automatic Substations Briefly Treated

AT A joint meeting of the Chicago Section, American Institute of Electrical Engineers, and the electrical section of the Western Society of Engineers in Chicago on Dec. 17 more than two hundred were present to hear a program on "Present Tendencies in Electric Railway Development and Available Means for Improvement." Papers were presented on the development of the design and use of the safety car by Harry L. Brown, on the results of safety car operation on the Waukegan city lines of the Chicago, North Shore & Milwaukee Railroad by H. A. Johnson, on train operation on urban railways by S. B. Way and on automatic railway substations by Charles H. Jones. Lieut.-Col. E. J. Blair, assistant to the president Chicago Elevated Railways, was chairman of the meeting.

All four papers were read and then simultaneously discussed. The paper by Mr. Way was published in abstract last week. The others appear elsewhere in this issue. In introducing the discussion, Colonel Blair commented that after hearing these papers it must be evident to those present that the electric railway managements have been very active in devising ways and means to cope with the ever-increasing operating costs.

Mr. Adams Describes Modified Car

H. H. Adams, superintendent of equipment Chicago Surface Lines, in discussing the safety car papers, spoke briefly of the consideration being given to the use of safety cars on certain semi-congested lines in Chicago. He made the point that for such service it seemed highly desirable that there should be a separate exit and entrance for passengers, in order to avoid the necessity to make boarding passengers wait until all leaving passengers have got off the car. He said that a detailed study is now being made looking toward the development of a safety car for Chicago having this feature and a little more generous dimensioning in other respects, without materially increasing the weight of the standard car. From the present state of the study he said it appeared that a design of car could be built with a 24½-in. aisle instead of 21¼ in., a seat width of 35 in. instead of 34⅜ in., an over-all width of 8 ft. instead of 7 ft. 8 in., an over-all length 16 in. greater than the standard car, and a seating capacity of thirty-six instead of thirty-two, without having the weight exceed 17,000 lb. This would give a weight of 472 lb. per seat as compared with 519 lb. per seat on the present standard double-end car, or a reduction of nearly 10 per cent. It is also planned to install some kind of barrier to prevent passengers from entering on the exit side for the purpose of evading payment of fare.

Mr. Adams also commented on the reference in Mr. Brown's paper to the saving in first cost to purchasers of safety cars resulting from their standardization. He said that he had not seen a great deal of evidence of this saving. He pointed out that the standard safety car weighing 16,600 lb. and bought for $7,300 was a cost of 44 cents per pound. The new double-truck cars which the Chicago companies are about to purchase will weigh 46,000 lb. and cost $15,000, or a cost per pound of 32.6 cents, a difference in the favor of the non-standard double-truck car of 11.4 cents per pound.

Referring to the plan to use trailers in Chicago, Mr. Adams said that within six months it is probable there will be available fifty new motor cars equipped for hauling the fifty trailers now under construction in the company's shops. He said that one of the great advantages of train operation is that it requires only 20 per cent more time for a two-car train to pass an intersection than it does for a single-car unit with one-half the capacity.

Automatic Substations Considered

Col. Bion J. Arnold reviewed briefly the history of the development of the automatic substation as it was worked out in the original installation on the Elgin & Belvidere Electric Railway, which he owns. This discussion was given in connection with the paper on automatic substations read by Mr. Jones.

A great deal of interest was manifest in the three-truck train discussed by Mr. Way. His description of this unique equipment and pictures of the train appeared in last week's issue of this paper.

The Fields of Trains and Safety Cars Are Compared

Wray T. Thorne said that the development of modern couplers and cars provided with doors closing up all openings while the cars are in motion eliminate the early objections to trailers. The economies of train operation in dealing with mass transportation are now available and where the traffic density warrants, and other operating conditions are favorable, service can be given at less expense than formerly, or much improved service can be rendered at relatively small increase in operating cost.

In the safety car we have a new transportation tool, but as in tooling a plant, a study and analysis of the conditions are necessary to insure a successful application. Where this elementary precaution has been most carefully observed these cars seem to have been the most successful.

It is evident that there are service conditions where such cars will not meet the requirements. Such, for example, are streets or routes whereon the headway with cars of large carrying capacity is now so close as adversely to affect schedule possibilities.

The one-man safety car apparently has demonstrated to many operators the old transportation law that frequency of service stimulates traffic. Most operators, however, have known of this law for years, but the cost of providing such additional service with available equipment has been prohibitory.

Results of Safety Car Operation in Waukegan, Ill.*

BY H. A. JOHNSON
Organization Engineer Chicago, North Shore & Milwaukee Railroad, Chicago

THE rapid growth in the popularity and use of safety cars is due, in my judgment, to the fact that railway properties operating under certain conditions have been able to make a substantial saving in operating expenses and at the same time give more frequent service. The more frequent service has attracted new business which the railway company did not previously enjoy.

The saving in operating expenses has been chiefly due to, first, a large reduction in platform expense due to this car being operated by one man instead of two men; second, a considerable reduction in the amount of power required to operate this car on account of its light weight, and, third, a reduction in the cost of maintenance.

While the foregoing statements apply in a general way to the operation of light-weight safety cars, it is impossible to work out any formula or standard set of conditions which will apply generally. Because safety cars have been a success on one property does not mean that every street railway should replace its present equipment with them. To determine whether this type of car would be economical and serviceable requires a detailed study of the operating conditions on the particular property. Accordingly I will confine myself to a discussion of the results of installing one-man safety cars on the Waukegan city lines of the property with which I am connected, rather than try to discuss the economic aspects in a general way.

These lines furnish the street car service for the adjacent communities of Waukegan, North Chicago and Great Lakes Naval Training Station. The city of Waukegan lies approximately 38 miles north of Chicago, extends along the west shore of Lake Michigan and has a population of 20,000. The town of North Chicago adjoins Waukegan on the south and has a population of about 5,000. The Great Lakes Naval Training Station, located on the shore of Lake Michigan, adjoins North Chicago on the south. During the war there were as many as 45,000 men in training at this station, but at the present time this number has been reduced to approximately 10,000.

The Waukegan city line is composed of two branches: One branch, which we shall call the North and South Line, extends north from the Great Lakes Naval Training Station through the town of North Chicago to the center of the city of Waukegan, a distance of 3.65 miles, and then continues north to the north city limits of Waukegan, an additional distance of 1.62 miles, making a total length of 5.27 miles. The other branch, which we may call the East and West Line, connects with the North and South Line at the center of the city of Waukegan and runs straight west to the west city limits, a distance of 1.03 miles.

The traffic on this local system is very similar to the traffic in larger cities in that there are heavy rush-hour periods night and morning, with comparatively light traffic outside of these hours. This is occasioned by the comparatively large number of industries depending upon these lines for transportation of their employees. There are nine of these factories, each employing 100 or more men. Two employ 1,000 men each, one employs 500 men, one employs 250 men, two employ 200 men each, one employs 150 men and two employ 100 men each.

During the year 1919 the service was performed by double-truck cars operated by two men and weighing approximately 25 tons each. These cars have a seating capacity of fifty, are 48 ft. long over all, equipped with four motors and multiple-unit control. On the North and South Line, cars were operated on a fifteen-minute headway, both during the rush hours and during the non-rush hours. During the rush hours, however, a second car was added, making a two-car train. On the East and West Line one car was operated during non-rush hours, making a round trip every twenty minutes. During the rush hours another car was added so that the interval was reduced to ten minutes.

TEN SAFETIES PUT IN SERVICE

In February of 1920 ten light-weight safety cars were put in service on the North and South Line. They are the standard safety car with certain modifications in construction and with certain additions in the nature of added insulation and heating equipment on account of the cold climate in this part of the country. They weigh 8½ tons.

The safety cars were put in service on the North and South line, which serves the industries and carries most of the traffic. They take care of the basic schedule and are supplemented during the rush hours by part of the old double-truck cars. The East and West Line is still operated with the double-truck cars. Before the safety cars were put in service the city authorities and the public were carefully prepared for the change by publicity work which included moving pictures in the theaters and there has been no criticism of the cars or their operation since the day they began to run. In fact, just the opposite is true. The public seems to like the safety cars better than the old double-truck cars because they are new, of more cheerful appearance, and the step and platform arrangement permits of more comfortable and easier entrance and exit.

Coincident with the placing of the safety cars in operation the schedules were changed to provide more frequent service. The interval on the North and South Line was reduced from fifteen minutes to eight minutes during both rush hours and non-rush hours. On the East and West Line the interval was made ten minutes all day and evening in place of ten minutes for rush hours and twenty minutes for non-rush hours.

Immediately after the safety cars were placed in service and the schedules changed, the traffic, which had remained practically constant for a long time, increased very decidedly. This increase has been maintained up to the present time. The increase in traffic and more frequent service has resulted in an increase in the number of car-miles operated. During the eight months following the change 493,856 car-miles were operated as compared with 314,535 car-miles during the corresponding eight months of the previous year or an increase of 57 per cent. The operating revenue for the same period increased 42.52 per cent. The operating expenses increased 34.16 per cent. The operating expenses per car-mile, however, decreased 14.8 per cent. This decrease was effected in spite of a general increase in wages in all departments of approximately 20 per cent and the payment to safety car operators of 5 cents per hour more than the rate paid motormen and conductors on cars operated by two men.

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*Abstract of paper read before joint meeting of A. I. E. E. and W. S. E., Chicago, Dec. 17, 1920.

On the double-truck cars the platform expense is two men at 60 cents per hour or a total of $1.20 per hour, while on the safety car it is one man at 65 cents per hour, indicating a saving of 45.8 per cent in platform expense for every car-hour operated with safety cars. The double-truck car operating on the North and South Line consumes electric energy at an average rate of 2.90 kw.-hr. per car-mile for traction, while the safety car requires 1.07 kw.-hr. per car-mile, which is 63 per cent less than the energy used by the double-truck car.

After paying all operating expenses and taxes, the income from operation for the Waukegan city lines covering the period of eight months following the introduction of safety cars shows an increase of 342.39 per cent. The addition of the ten safety cars has, of course, increased the capital account and the annual interest charges. If the trainmen's wages during the period following the introduction of the safety cars had remained on the same level as during the corresponding period of the previous year, and if the amount of the additional interest on the investment in safety cars is charged against the operating revenue, the income from operation after introducing the safety cars would show an increase of 441 per cent for the same periods as previously considered.

The results described have been brought about by a partial change to light-weight safety cars. If a complete change had been made and all of the double-truck cars disposed of, the economies would have been greater. The public has been satisfied with the introduction of the safety cars because it has received more frequent service with clean, fast cars. The railway company has been satisfied because the passenger traffic has increased, the income from operation has materially increased, jitney competition has been eliminated and it has the satisfaction of giving better service to the communities served.

Advantages of Automatic Railway Substations*

By Charles H. Jones
Electrical Engineer Chicago, North Shore & Milwaukee Railroad, Chicago

INSTALLATIONS of automatic railway substations have been made on light and heavy interurban service, light city service, heavy trunk-line service through the Detroit Tunnel of the Michigan Central Railroad, and recently an installation has been made for the heavy city service at Cleveland, Ohio. This last installation will be watched with considerable interest by engineers on account of its being the first extensive application in this class of service. These installations have been on equipments varying in size from 300 to 2,000 kw. From the foregoing it is apparent that trials have been made in all classes of railway service, yet the development of this equipment is only in its infancy, and the extent to which it will be used is limited only by the economical results which can be obtained.

The advantages of automatic over manually operated substations are as follows:

1. Reduction in cost of substation operating labor. This benefit will be felt in every field of application of the equipment and is probably the greatest single saving that can be made.

2. Reduction in power loss due to elimination of idle running time. This saving will be of considerable value to the property on which the service is infrequent and where it is impractical to follow the load in a hand-operated station by shutting down and starting up the station frequently, which the automatic equipment will do. This will be of no practical benefit on a system which has a fairly steady load throughout the normal hours of the day, but it will at least be an insurance that there are no idle running losses.

3. On account of the increased number of substations in an automatic system, there results a considerable reduction in the size and length of feeders, and a saving that will go a long way toward paying the investment cost in automatic equipment. This reduction in the magnitude of the feeder system accomplishes considerable saving in line losses.

4. On city properties the automatic substation will have a very favorable effect on electrolysis conditions because of the increased number of substations and reduction in length of feeds.

5. A substantial saving per substation can be made in the building cost because it is practical to erect a cheaper building if the conveniences necessary for a hand-operated station are omitted. The small size of the building will make it possible to put it in places that are beyond consideration for a multi-unit hand-controlled substation.

6. By the use of automatic equipment it is possible to raise the load factor on machines, thereby making use of smaller units than is possible in the manually operated station. This is of considerable importance on interurban lines having a high starting peak and low average load.

The limit to which this equipment can be economically installed is reached when the carrying charges on an automatic substation installation, together with its feeder system, equal the operating and carrying charges on a manually operated substation plus its feeder system. Although there is no question about the applicability of the automatic station to interurban and small city properties, the advisability at its introduction is debatable on a heavy city property which has a dense load per square mile, such as exists in the Loop and densely populated residential district of Chicago. This problem can only be answered by a very careful analysis of the situation at hand.

Probably one of the most extensive fields for the automatic stations is in steam railroad electrification work, where the conditions are ideal for its application, namely, heavy peak service and comparatively long train interval. The limitations of both a.c. and d.c. power systems of steam roads have been fairly well known for some time, but the advent of automatic substations has extended the possibility of the d.c. system to limits far beyond those previously set, and it will undoubtedly receive very careful consideration in future electrifications.

Results on North Shore Road

The history, condition and general results of automatic substation on the Chicago, North Shore & Milwaukee Railroad are as follows:

In 1916 manually operated substations were located approximately 13 miles apart. On account of the purchase of new car equipment it was necessary to increase the power facilities. Consideration was given to three methods; namely, addition of feeder copper, increase of line voltage and the installation of automatic substations. The two first were prohibitive on account of the great cost, and it was decided to install automatic stations located approximately half way between the manually operated stations. Two of these were installed in 1917, a third in 1918 and a fourth in the spring of 1919. One of the hand-operated stations was changed to automatic in the spring of 1920 and a fifth station is now being installed.

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*Abstract of paper read before joint meeting of A. I. E. E. and W. S. E., Chicago, Dec. 17, 1920.

These equipments, which have been in service from one to three years, have been subjected to very heavy service and have given excellent operating results. In several instances we have run into the usual operating difficulties that are encountered in substation work, and the automatic equipment has taken care of these cases in a manner just as satisfactory, if not more so, than in hand-operated stations.

It has been our practice to make a daily inspection of stations, and by means of recording devices mounted on certain pieces of apparatus we have been able to follow the operation very closely, so that I have no hesitancy in saying that there is no reason why a system such as ours could not be operated practically automatic throughout, with the exception of the necessary high-tension line switching. I feel that within a very short time we shall see very extensive installations made.

Automatic Railway Substations

BELOW appears a list of the automatic substations recently installed or on order by the General Electric and Westinghouse companies, which supplements a similar table published in the JOURNAL for Jan. 4, 1919. Those installations which, at the time the other table was published, had not been placed in commission, or regarding which full information was not available, are included in the present tabulation.

AUTOMATIC SUBSTATIONS INSTALLED BY OR ON ORDER WITH GENERAL ELECTRIC AND WESTINGHOUSE COMPANIES

Company	No. of Stations	No. of Machines	Kilowatt Rating	Type of Machine	Direct Current Voltage	High-Tension Voltage	Frequency	Remarks	Placed in Operation
Ohio Electric Railway	1	1	500	Synchronous converter	600	33,000	25		May, 1918
Conestoga Traction Company	1	1	300	Synchronous converter	600	11,000	25	Motor started	September, 1918
New York State Railways	1	1	250	Synchronous converter	600	11,000	25		February, 1919
Conestoga Traction Company	1	1	500	Synchronous converter	600	11,000	25		March, 1919
Des Moines City Railway	1	1	500	Synchronous converter	600	2,250/4,500	25		March, 1919
Cincinnati, Lawrenceburg & Aurora Electric Street Railway	2	2	200	Synchronous converter	600	33,000	60		March, 1919
New York State Railways	1	1	300	Synchronous converter	600	60,000	40		April, 1919
Northern Ohio Traction & Light Company	2	2	500	Synchronous converter	600	22,000	60		May, 1919
Joplin & Pittsburgh Railway	1	1	300	Synchronous converter	600	22,000	60		May, 1919
The Sheffield Company	1	1	500	Synchronous converter	600	2,200	60		June, 1919
Kansas City Railways	1	1	1,000	Synchronous converter	600	6,600	25		June, 1919
Chicago, North Shore & Milwaukee Railroad	1	1	1,000	Synchronous converter	600	13,200/33,000	25		June, 1919
Duluth Street Railway	1	1	500	Synchronous converter	600	13,200	25		June, 1919
Transit Supply Company	1	1	1,500	Synchronous converter	600	12,500	35		July, 1919
Omaha & Council Bluffs Street Railway	1	1	1,000	Synchronous converter	600	13,200	25		July, 1919
Pacific Electric Railway	1	1	1,000	Synchronous converter	600	15,000	50	Slauson Junction	July, 1919
Salt Lake, Garfield & Western Railway	2	2	600	M-G set	1,500	44,000	60	One-remote control	August, 1919
Duluth Street Railway	1	1	1,000	Synchronous converter	600	13,200	25		August, 1919
Pacific Electric Railway	1	1	1,000	M-G set	600	15,000	50	Wilmington	August, 1919
Pacific Electric Railway	1	1	1,000	Synchronous converter	600	16,500	50		August, 1919
Joplin & Pittsburgh Railway	2	2	300	Synchronous converter	600	33,000	25	Motor started	August, 1919
Kansas City Railways	1	1	750	Synchronous converter	600	6,600	25		October, 1919
New South Wales Government Railways	1	1	200	Synchronous converter	600	6,600	25	Remote control	November, 1919
Chicago, North Shore & Milwaukee Railroad	1	1	500	Synchronous converter	600	13,200/23,000	25	Libertyville	November, 1919
Pacific Electric Railway	1	1	1,000	Synchronous converter	600	16,500	50	Hermosa	November, 1919
Oklahoma Union Railway	1	1	300	Synchronous converter	600	6,600	60		January, 1920
Wisconsin Light, Heat & Power Company	1	1	300	M-G set	600	66,000	60		January, 1920
Interurban Railway, Des Moines	1	1	500	Synchronous converter	600	22,500	25	Moran	January, 1920
Interurban Railway, Des Moines	1	1	300	Synchronous converter	600	22,500	25	Granger	January, 1920
Sacramento Northern Railway	1	1	300	Synchronous converter	600	2,300	60	Portable	January, 1920
Kansas City Railways	1	1	750	Synchronous converter	600	6,600	25		March, 1920
Iowa Railway & Light Company	1	1	500	Synchronous converter	600	16,500	60		April, 1920
Pacific Electric Railway	1	1	1,500	Synchronous converter	600	16,500	50	Maple Avenue	April, 1920
Michigan Central Railroad	1	1	2,000	M-G set	650	4,400	60	Remote control	May, 1920
Missouri & Kansas Interurban Railway	2	2	300	Synchronous converter	600	33,000	60		June, 1920
Cleveland Railway	1	2	1,500	Synchronous converter	600	11,000	60		August, 1920
Lehigh Valley Traction Company	1	1	500	Synchronous converter	600	13,200	25		September, 1920
St. Joseph Railway, Light, Heat & Power Co.	1	1	300	M-G set	300	23,000	60		October, 1920
Iowa Railway & Light Company, for Cedar Rapids & Iowa Railway	1	1	300	Synchronous converter	600	33,000	60		December, 1920
Grand Rapids, Grand Haven & Muskegon Railway	1	1	350	Synchronous converter	600	13,500	30	Motor started	December, 1920
Chicago, North Shore & Milwaukee Railroad	1	1	1,000	Synchronous converter	600	23,000/33,000	60	Ravinia Park	January, 1921
Indianapolis & Louisville Traction Company	1	1	500	Synchronous converter	600	33,000	60		January, 1921
Christ Church Tramway, New Zealand	1	1	300	Synchronous converter	600	11,000	50		*1920
New South Wales Government Railways	1	1	450	Synchronous converter	600	6,600	25	Narrabean-remote control	*1920
New South Wales Government Railways	1	1	450	Synchronous converter	600	6,600	25	Abbotsford-remote control	*1920
Chicago & Joliet Electric Railway	1	1	300	Synchronous converter	600	13,200	60		
Ironwood & Bessemer Railway & Light Co.	1	1	300	M-G set	600	2,300	60		
Iowa Railway & Light Company	1	1	500	Synchronous converter	600	33,000	60		
Sacramento Northern Railway	1	1	300	Synchronous converter	600	2,300	60		
United Railways of St. Louis	1	1	300	Synchronous converter	600	13,200	25		
Hershey Cuban Railway	1	1	300	Synchronous converter	600	22,000	60		
Niagara, St. Catherines Railway	1	1	500	Synchronous converter	600	12,500	25		
Christ Church Tramway, New Zealand	1	2	300	Synchronous converter	600	10,500	50		
City Railway, Los Angeles	1	1	1,000	Synchronous converter	600	17,000	50		
Pacific Electric Railway	1	1	750	Synchronous converter	600	16,500	50		
Dayton & Western Traction Company	3	3	500	Synchronous converter	600	33,000	60		
Victorian Railways, Melbourne	8	8	1,000	Synchronous converter	1,500	2,000	25		
Interurban Railway, Des Moines	1	1	750	Synchronous converter	600	22,500	25		
Dayton & Troy Electric Railway	1	2	300	Synchronous converter	600	6,600	60	Operate in parallel	
Hershey Cuban Railway	2	2	1,000	Synchronous converter	1,200	33,000	60	Two units in series	
Fort Wayne & Decatur Traction Company	1	1	400	Synchronous converter	1,200	33,000	60	Two units in series	
Cleveland Railway	2	4	1,500	Synchronous converter	600	11,000	60	Two units in parallel	
Cleveland Railway	1	2	1,500	Synchronous converter	600	11,000	60	Two units in parallel	
Pacific Northwest Traction Company	1	1	500	Synchronous converter	600	13,200	60		
Milwaukee Electric Railway & Light Company	1	1	1,000	Synchronous converter	250	13,200	60	Three-wire service	
Toronto Hydro-Electric Company	1	1	1,000	Synchronous converter	600	13,200	25		
York Railway	2	2	500	Synchronous converter	600	13,200	60		
Petaluma & Santa Rosa Railroad	1	1	300	Synchronous converter	600	45,000	60		
Steubenville, East Liverpool & Beaver Valley Traction Company	1	1	300	Synchronous converter	600	13,200	60	Motor started	
Milwaukee Electric Railway & Light Co.	1	2	500	Synchronous converter	600	66,000	25	Two units in parallel	
Northern Texas Traction Company	1	1	500	Synchronous converter	600	13,200	25		
United Railways of St. Louis	1	1	300	Synchronous converter	600	13,200	25		
Boston & Maine Railroad	1	1	300	M-G set	600	2,200	60	Synchronous motor	
Chicago, South Bend & Northern Indiana Railway	1	1	300	Synchronous converter	600	25,000	60		
Los Angeles Railway	1	1	1,000	Synchronous converter	600	15,000	50		
Salt Lake & Utah Railroad	1	1	500	M-G set	1,500	2,300	60		

* These stations are probably in operation, though exact date is not yet available.

Progress of the One-Man Safety Car*

This General Treatise Reviews the Advent of the Light-Weight One-Man Safety Car, Points Out the Present Status and the Future Prospects of Design and Utilization and Cites the Economic and Service Results Which Have Been Obtained

BY HARRY L. BROWN
Western Editor ELECTRIC RAILWAY JOURNAL

HIGHER schedule speeds, platform expense cut in half and energy cost greatly reduced are the qualities of the safety car which make it possible to give greatly improved transportation service and meet competition of automotive vehicles—private automobiles and jitneys.

Until recently very little information on the energy consumption of this type of car was available. Some interesting data are now coming to hand, however, from companies whose cars have been equipped with Sangamo Economy watt-hour meters. In El Paso, Tex., where the topography is flat, the energy consumption per car-mile at the car, averaged over a three-month period, was found to be 2.44 kw.-hr. for double-truck cars, 1.45 kw.-hr. for single-truck cars and 0.95 kw.-hr. for safety cars. These figures and those following cover only the energy consumption of the main motors. In Kansas City on the Westport-Sunset Hill line, operated exclusively with safety cars under service conditions considered most severe, the energy consumption averages 1.2 kw.-hr. per car-mile. At Gary, Ind., the consumption has been found to be 1.1 kw.-hr. per car-mile. In Seattle, under extremely hilly conditions, the average energy consumption over an eight-month period was 1.38 kw.-hr. per car-mile for safety cars and 3.37 kw.-hr. per car-mile for double-truck cars, the data covering fifty safety cars and 350 double-truck cars. In Quincy, Ill., the average energy consumption for safety cars for all lines on the system was found to be 0.95 kw.-hr. per car-mile with a system average schedule speed of nearly 10 m.p.h. At the station buses this energy consumption measured 1.78 kw.-hr. per car-mile. In Vincennes, Ind., during a thirty-day period with average loading throughout the period of 4.7 passengers per car-mile, the energy consumption was 0.75 kw.-hr. per car-mile.

An interesting side-light on this subject of energy consumption is that on the average, for various systems, there is a difference of about 1 kw.-hr. per car-mile between the meter readings on the car and those at the station switchboard, representing energy consumed in line losses and negative return losses, and in running the air compressor, heaters, lights, electric buzzers, signals, etc.

RESULTS FROM SOME INSTALLATIONS

One of the most interesting installations of safety cars that I recall gives a good idea of the many ways in which these little cars serve to improve the situation faced by the street railway companies. On the Arlington Heights line, Fort Worth, Tex., which is 4.88 miles long one way, four 7-ton one-man safety cars replaced five 12-ton two-man single-truck cars for the base service. With an increase in the schedule speed from 9 to 11 m.p.h., the same headway of twelve minutes was maintained, this being ample in view of a diminishing traffic following the abandonment of a small army camp served by the line. The service, measured in seats per hour, remained practically the same. The track, much of which was open, was in bad condition, and while the old single-truck cars rode so roughly as to be dangerous, the safety cars, operating at higher speed, negotiated the rough track with no discomfort to passengers. Furthermore, the voltage drop on the line with the old cars was excessive, but with the new cars, fewer in number and each pulling less current, the voltage drop was not unsatisfactory. Thus the installation of safety cars enabled the company safely to defer track repair expense and avoid more investment in overhead copper.

The table below gives a comparison of the cost of operation of these lines for the two weeks just prior to the safety-car installation, with that for the first two weeks of safety-car operation. Including the tripper and extra service in this summary, there were operated in the second two-week period eighteen fewer car-hours but 157 more car-miles.

Daily saving in cost of energy	$4.18
Daily saving in cost of maintenance	7.75
Daily saving in platform expense	55.66
Total daily saving in operating expenses	$67.59
Total annual saving in operating expenses	$24,670.35

This case illustrates only the economical aspect of safety cars, for on this line the twelve-minute headway was all that was warranted by the traffic that could be secured.

Table I gives interesting information from other cities.

TABLE I—RELATION BETWEEN INCREASE IN CAR-MILES AND IN GROSS REVENUE, VARIOUS CITIES

City	Line	Increase in Car-Miles, Per Cent	Increase in Gross Receipts, Per Cent
Kansas City, Mo.	Sunset Hill	47	19
Richmond, Va.	Belmont Ave.	55	23
Richmond, Va.	Laurel St.	40	20
Houston, Tex.	Woodland LaBranch	45	60
El Paso, Tex.	1	47.5	50
El Paso, Tex.	2	50	36.7
Tacoma, Wash.	1	75	42
Tacoma, Wash.	2	20.9	25.8
Tacoma, Wash.	3	3.4	17.31
Tampa, Fla.	Woodlawn	60	62
Tampa, Fla.	Nebraska	52	51.4
Tampa, Fla.	West Tampa	70	61

The car about which we are talking has been called the "safety" car. The name was derived from the effort made so to equip it with automatic safety devices that the use of a one-man crew would entail no extra hazard to passengers. Table II on page 178 gives some detail evidence of how well it has lived up to its name in Terre Haute compared with the two-man cars.

The substance of this study is that the number of accidents of all kinds per 100,000 car-miles is slightly higher for safety cars than it is for two-man cars, but, due probably to the light weight of the safety cars, the number of accidents involving expense is substantially less. Also, the cost of accidents per 1,000 car-miles is only about one-half as much for safety cars as for two-man cars. Here, again, the relative weight of the cars is probably the most important factor in the difference.

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*Abstract of paper read before joint meeting of A. I. E. E. and W. S. E., Chicago, Dec. 17, 1920.

THE STANDARD CAR AND TENDENCIES IN DESIGN

In designing the one-man safety car the builders conceived the idea of developing a standard car that could be produced on a quantity basis with resultant lower cost to the consumer and better profit to the car builder. Standardization of electric railway equipment had been a constant topic of association discussion for years, but little real progress along this line had been accomplished. With the advent of this new type of car, however, embodying a radical departure from all previous practices, there seemed to be a good opportunity to start standardization in earnest. By tenaciously holding to the fundamentals of the design, the original designers have succeeded to a remarkable degree in preserving their aim in this direction, and hence of being able to build cars for stock regardless of the city in which they would ultimately be used. In fact, it is now actually possible to order street cars from stock almost as one does an automobile.

TABLE II—ACCIDENT RECORDS IN TERRE HAUTE FOR SAFETY CARS AND TWO-MAN CARS

Twenty-three Months, Dec. 1, 1918, to Oct. 31, 1920

	Safety Cars	Two-Man Cars
Total accidents reported	786	270
Deduct accidents causing no damage to persons or property	553	107
Accidents involving expense	233	163
Total cost, all accidents	$32,259.32	$22,253.73
Average cost per accident (those involving expense)	$138.45	$136.52
Average cost per accident (all reported)	$81.04	$82.42
Total car-miles (thousands)	708.1	1,376.0
Number of accidents, all kinds, in each 100,000 miles	21.1	20.0
Number of accidents, involving expense, in each 100,000 miles	6.28	11.8
Or, one in every	15,923 miles	8,478 miles
Average cost accidents per 1,000 car-miles	$8.69	$16.17
Number of cars operated, beginning of period	15	16
Number of cars operated, end of period	49	1

The original standard safety car had a practically all-steel, arch-proof, single-end body with a 30-in. single door at the front end for entrance and exit. It was equipped with fourteen cross-seats and an end seat, affording capacity for thirty-two passengers. It was mounted on a single truck with a 9-ft. wheelbase and equipped with two 25-hp. motors and 24-in. wheels. The motors, air-brake system, air compressor, control and other equipment were all of a special type, newly designed for the innovation in the urban transportation world. These first cars, completely equipped, weighed but 12,500 lb. or 390 lb. per seat—a new low record in the industry.

Desirable as this light weight was from an energy-economy standpoint, it soon developed, after the first cars were in service, that they were too frail and would have to be strengthened. The demands of the industry in this connection, based on experience in using the cars, have been so insistent that the manufacturers have been forced to strengthen the car from time to time in one member and another, both body and truck, until now the standard single-end safety car weighs approximately 16,000 lb. or 500 lb. per seat, and the standard double-end safety car weighs 16,600 lb. or 519 lb. per seat.

In addition to these vital questions of weight and strength in safety-car design, there have been numerous other less important tendencies away from the exact standard safety car. For the more northern cities it has been necessary to use interior side sheathing and headlining to make the car warmer, and in some cases extra heating elements have been specified. Double flooring has been required for the same reason in the north, and in other cities managements have insisted on this to reduce the noise within the car. Some railway managements have insisted on spring-cushion seats, and others have required that the interior of the car be better finished for sake of appearance. In a few cases, the arrangement of seats has been changed, the end cross-seats being turned longitudinally to provide a larger well for standing passengers. There has also been some demand for a wider aisle, seats a little wider, and in general that the car should be a little more generously dimensioned.

There is a more important change in the body design than those just mentioned, which is being advocated by operating men in increasing numbers, despite strong opposition. It is urged that there ought to be a separate passageway for the ingress and egress of passengers so that two opposing streams of passengers can be moving simultaneously while the car is standing. At present, with the single doorway for both entrance and exit, it is necessary for boarding passengers to wait until all the leaving passengers have got off before they can get on. This is an annoyance to patrons and lengthens the stopping time of the car. Whether separate exit and entrance are desirable or not, the sentiment for them has been steadily gaining ground. This applies to small and large city users alike, and double-door cars have already actually been built for Mason City, Iowa; Madison, Wis.; Fort Wayne, Ind., and two or three other cities. In Madison single-door safety cars were replaced with new and rebuilt safety cars equipped with double doors.

The desirability for this change to double doors and more generous dimensioning is also closely associated with the idea of using safety cars on many of the lines of the largest city systems. It is felt by many that these slight changes would greatly extend the field of adaptability of the standard cars.

There are numerous lines in Chicago as in other big cities where safety cars could be installed with resulting improvement in service, better earnings, gross and net, and a better pleased public. Where these cars are used they should not be permitted to be overloaded unduly, for the inherent skip-stop feature of the small load, and the slow ingress and egress of passengers in a jam, would slow up the speed and defeat the advantages which otherwise accrue.

When safety cars are used on these heavier city lines, several things can be done to aid their success or enhance the economies and increased earning power they afford. One of these is a slight change in the design of the car body, which has already been discussed. Another is the use of a street collector at heavy loading points to aid the operator. He should be placed either at the rear emergency door, as is done in Kansas City, or at the regular entrance, simply to make change, sell tickets, etc. Still another thing that might serve to speed up the little cars would be to make use of a combination pay-enter, pay-leave, fare collection system. On runs where there is a scattered loading and a concentrated unloading, passengers would pay as they enter. On runs with heavy loading concentrated in a small district and a scattered unloading, passengers would pay as they leave. On many lines this should result in materially speeding up the service.

Real Service in a City of 30,000

Indiana Railways & Light Company, Which Operates In and Around Kokomo, Has Found that the Safety Car Pays—Some Construction and Operating Data Are Given

By C. T. Dehore
General Electric Company, Cincinnati, Ohio

IT IS a real problem to give electric railway service in a city of 30,000 population and come anywhere near breaking even. Kokomo appears to be doing it with the aid of safety cars. Up to July 1, 1920, the service on the main city line in the city was on a ten-minute headway, requiring four double-truck cars, seating about forty-four people and weighing 16 tons. Three or four trippers were put on morning and evening. Generally speaking, the service was above the average for cities of this size, and the rolling stock was modern and well maintained.

TABLE I—PASSENGER BUSINESS IN KOKOMO BEFORE AND AFTER INSTALLATION OF SAFETY CARS

Month	1919	1920	Increase	Per Cent of Increase
July	253,779	314,064	60,285	24
August	267,557	321,731	54,174	20
September	285,696	334,949	49,253	17
October	249,528	315,975	66,447	27
November	253,241	313,512	60,271	24

The management of the company, after a study of the performance of safety cars throughout the country, and particularly in Terre Haute, decided in January, 1920, to purchase ten safety cars. The cars went into service on July 1.

The four large cars referred to were replaced with eight safety cars on a six-minute headway. This reduced the schedule speed from 9.6 to 7.5 m.p.h., and the round trip running time increased from forty to forty-eight minutes.

TABLE II—CAR-MILES AS INCREASED BY SAFETY CARS IN KOKOMO

Month	1919	1920	Increase	Per Cent of Increase
July	37,535	49,160	11,625	31
August	39,845	49,935	10,090	25
September	38,288	50,020	11,732	30
October	36,875	49,070	12,195	34
November	36,184	46,890	10,706	30

As a result of the new service numbers of passengers carried increased as shown in Table I and the car-miles were increased as shown in Table II.

Cost of Operation as Affected by Safety Cars

The power consumed by the eight safety cars is approximately the same as before, except that some little additional is required for heating because the new cars are better heated. The cost of power is, therefore, practically only increased due to increase in the cost of coal and other items of production.

The total cost of maintenance of equipment is running about the same as before. Up to date repair material for the maintenance of the new cars has cost less.

Platform expense has increased slightly, due to an increase in rate of pay. The old rate was 34 to 39 cents; the new is 40 to 45 cents.

The inspection of equipment is very rigid and the cars are kept scrupulously clean. Immediately upon the development of any defect or irregularity, such as leaks in any of the air valves or equipment, etc., the inspector sends the car to the shop. The same shop force handles the eight safety cars as previously looked after the four double-truck cars. One car cleaner has been added.

THE KOKOMO SAFETY CAR IS POPULAR

The reduction in the schedule speed from 9.6 to 7.5 m.p.h. was made with the idea of reducing the number of collisions with automobiles and other vehicles. The result in this regard has been gratifying, while boarding and alighting accidents have been eliminated entirely.

TABLE III—DETAILS OF KOKOMO SAFETY CAR

Builder	American Car Company
Type	Standard Birney Safety
Seats	32
Motors	GE-264-A
Control	K-10 double end
Seats	Brill Waylo
Air compressor	GE-CP-25, 10 ft.
Governor	GE-ML-A-1
Registers	International air operated
Signs	Keystone

Some of the "Reactions" Produced

At first the operators were skeptical as to the practicability of the cars, as well as their own ability to operate them. However, this feeling has since worn away and the men are now very enthusiastic over their performance.

The public is pleased with the new cars and the people of Kokomo feel that they are being given "real service."

TABLE IV—SUMMARY OF KOKOMO SAFETY CAR DATA

	1919	1920	Percentage, Increase	Percentage Decrease
Number of cars operated	4	8	100	...
Number of men required	8	8	..	...
Headway	10 min.	6 min.	..	40
Miles per hour	9.6	7.5	.	22
Running time	40 min.	48 min.	20	...
Car-miles	188,727	245,075	30	...
Passengers	1,309,801	1,600,231	20	...
			1919	1920
Rate per hour			34 to 39 cents	40 to 45 cents

The railway management feels that the demands of the public for increased service could not have been met in any other way without a material increase in the rate of fare or the incurring of a large operating loss.

The details of the car are given in Table III.

The Kokomo installation was made under the direction of Phil H. Palmer, general manager Indiana Railways & Light Company, who furnished the above data.

Some Pennsylvania Commission Policies

Chairman Ainey in an Address to the Philadelphia Chamber of Commerce Outlines the Underlying Laws and Policies of the Pennsylvania Commission — Commission Regulation Supersedes Contractual Relations

IN A recent address to the Philadelphia Chamber of Commerce W. D. B. Ainey, chairman of the Public Service Commission of Pennsylvania, outlined some of the important features of the organization and authority of the Pennsylvania Commission.* He pointed out that with the passage of the public service company law, which went into effect Jan. 1, 1914, there was inaugurated an entirely new method of utility control for Pennsylvania, although commission regulation had existed for many years in other states. The commission, while not strictly a judicial body, as it is an arm of the legislative branch of the government, nevertheless bases its judgment on evidence and not upon private communication or petitions.

REGULATION'S PURPOSE IS TO PRESERVE UTILITIES

Mr. Ainey said that public service regulation would have been comparatively simple when the commission started to work, "if all public service corporations could have been, on that day, re-created and the program and policy of the commission directed solely to the future, but nearly all of these corporations came into existence under general laws or special statutes passed many years before. There had been created under them situations which after Jan. 1 would not have been permitted, but which under the law theretofore existing were, in most instances, perfectly legal." He further pointed out that the enactment of the law was in recognition of the fact that utility service was important to the Commonwealth and that the preservation, not destruction, of the companies was essential to public welfare and convenience.

One necessary purpose was to get rid of discriminatory or preferential contracts where these existed under conduct or contract and the Legislature made certain prohibitions with reference to rates and practices. "This brings us to a differentiation which, in considering the public service company law, we must make between those policies which have been (a) legislatively adopted by the state and therefore are as binding on the commission as they are upon utility companies and their patrons and (b) those which are adopted by the commission under the broad discretionary powers lodged with it."

The law impressed upon utility companies the character of public servants and almost entirely removed them from the realm of corporations, but emphasized in so doing that "their services were required by the public and their preservation was essential for the public good." In line with this, limitations were imposed upon revenues, limiting them to a fair return, and thus rates and service devolved upon the commission. In the exercise of this power comes the application of the principle that the government might interfere with charter powers and privileges theretofore granted, if the general public welfare is involved, and thus "contracts are no longer inviolate when they stand in the way of an important public policy."

Another point related to this is that any regulatory policy of the state directed toward the companies must likewise regulate their patrons and the public itself, if it is to be effective. Thus municipal and private contracts fixing rates and determining revenues and service must also give way whenever they are in conflict with the aims desired. On this point he said:

> "I have in mind a street railway operating through several municipalities; in one there was a 3-cent fare fixed in an ordinance, in another a 5-cent fare, and in some others no rates of fare were prescribed. The increased labor and material costs were such that the operating expense exhausted the revenues. It became necessary to increase the fares, if service was to be continued. If the legislative hands were tied and these contract rates were continued the entire burden of the increase would have had to be placed upon the riders in the municipalities having no contracts, and the others would be relieved. Admittedly no more unjust, inequitable or discriminatory situation could arise. The public service company law was intended to correct such injustices. Private contracts afforded opportunity for the best or more influential trader to secure better rates than others not so aggressive or powerful."

Likewise if there are standards of service and limitations of revenues, then any unusual burden "contractual or otherwise" which prevents the preservation of the utilities and the rendition of adequate service at reasonable rates cannot, and ought not, to be continued, in the interests of the public itself.

Mr. Ainey showed that the power thus exercised by the state is not unique and he found similarity in the eminent domain laws, health laws and tax laws. "Public service and private rate contracts," he said, "are incongruous when they conflict. Rates themselves cannot be based, if they are to be equitably apportioned among patrons, upon private contracts any more than taxes can be fixed by agreement between tax collectors and property owners. There is a striking similarity between taxes and public service rates in so far as the bases upon which they are imposed is concerned."

LAW, NOT COMMISSION, INVALIDATES CONTRACTS

Again adverting to distinction between legislative policies and discretionary policies which are prescribed by the commission, Mr. Ainey pointed out that the former have become the settled law of the Commonwealth, equally binding upon commission and public. The commission determines reasonable and just rates in service, but when the rates are determined, "the law and not the commission declares any conflicting contract rates invalid. . . . The whole duty of the commission under the statute is to ascertain what are the just and reasonable rates, and automatically the statute is applied as against any other rates arising on contracts."

Mr. Ainey then showed that the commission had within its discretion adopted the "non-competitive rule" as a policy, but said that "when the reason for the rule fails, the rule itself must fail." The theory of this rule is that duplication of facilities requires a duplication of investment and capital, and there is thus imposed a double burden upon the rate payers. All that competition does is to hold rates to a reasonable basis, and this is done by the commission.

In closing Mr. Ainey said that these public utility questions are but a part of the great economic questions which confront the country today and which demand of all the most thoughtful consideration. "There is no more patriotic service to which we may give our attention. The times stress them upon us. We must approach them with disinterested and highest motives, but fearlessly and forcefully."

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*A subsequent article, now in preparation, will describe in detail the organization and methods of the Pennsylvania commission.

Indiana Utilities Join in Meeting Devoted to Public Relations

Presidents Gadsden, Insull and Munroe of American Electric Railway, Electric Light and Gas Associations Were Speakers at the First Annual Meeting, Which Was Attended by More than 250 —Addresses Given by Commissioner Paul P. Haynes and E. K. Hall, American Telephone & Telegraph Company—Charles L. Henry Presided

THE first annual meeting of the Indiana Public Utility Association, formed about a year ago to sponsor the Indiana Committee on Public Utility Information, proved to be a conspicuous success and of far-reaching value. The meeting, with an attendance of more than 250, began at a 12:30 luncheon in Indianapolis, Jan. 13, and extended through the afternoon and a dinner in the evening. It was devoted entirely to the consideration of improving the relations of the utilities with the public. Charles L. Henry, president Indianapolis & Cincinnati Traction Company, as first and re-elected president of the new association, presided at the luncheon, afternoon and dinner sessions. The program included addresses by the presidents of the American Electric Railway Association, the National Electric Light Association and the American Gas Association and by a prominent telephone man, a member of the Indiana Public Service Commission and the Mayor of Indianapolis. Harry Reid, president Interstate Public Service Company, Louisville, Ky., and vice-president of the Indiana Association, was largely responsible for the excellent program of timely papers.

Mr. Henry spoke briefly of the organization of the Indiana Public Utility Association to include all classes of utilities into a compact organization for the purpose of providing a more effective machinery with which to deal with the common problem of public relations. He said there will be no attempt to revolutionize things in Indiana, but that the association will function to bring to the citizens of the State the things they ought to know about their public utilities.

To correct any possible misapprehension Mr. Henry pointed out that there was no desire to endeavor to dominate governmental agencies or legislation in any way. He called particular attention to Article II of the constitution of the association, adopted at this meeting, as the best expression of the object of the association. This article reads as follows:

> The object of this association shall be the collection and dissemination of information relating to the operating, technical and commercial conditions and problems affecting public utilities, and upon those questions affecting the relations between public service companies and the communities which they serve, so as to assist the companies in the management of their affairs in serving their communities and in promoting cordial relations between the public and themselves, and to cultivate friendly and social relations between the officers and employees of the several companies.

Mr. Henry also laid particular emphasis on the point that the utilities are on trial every day in the year, and that while this circumstance places them in a position which is very difficult and trying men occupied in this work ought to be very proud of their positions.

Paul P. Haynes, member of the Indiana Public Service Commission, then addressed the association, making statements to which repeated references were made by later speakers representing the utilities. He said that it is the usual contention that there are two sides to the utility business, but that he was of the opinion that there is but one side. The interests of the public utilities and of the public are so inextricably associated that what is good for the public is good for the utility, and vice versa; that when one prospers or suffers, the other does likewise. Referring to the work of the newly formed association, he said that to the extent that the association approaches the utility problems as public problems, to that extent will the association's work be successful.

The commissioner then explained how utility rate increases have lagged far behind the increases in prices of commodities generally. In other words, the orders of the utilities commissions have not been prompt enough to keep the utilities in sound financial condi-

Six Points Made by Commissioner Paul P. Haynes at Indianapolis Meeting

1. The average increase in utility rates during the last four years has been substantially less than the increase in the price of other necessities.
2. The utilities generally have earned less than a fair return on their sound valuation and they should now be permitted to recoup reasonable losses.
3. Existing rates are not based on peak war costs and therefore considerable reduction in prices of commodities will have to be experienced before these prices reach the present basis of present rates.
4. During these four lean years there has been an immense accumulation of deferred maintenance which must be taken care of.
5. The sum of $100,000,000 should be expended in the next two years in Indiana to provide needed extensions and improvements, and the public should know that this money cannot be had unless the credit of the utilities is restored through better revenue.
6. The situation demands a sympathetic understanding of these facts on the part of the public.

tion. He said that we are now reaching a turning point, that prices are very generally on the decline. This fact, he said, bids fair to react very unfavorably upon the utilities unless the public is brought to understand that it would be to the public's own serious detriment to insist upon rate reductions immediately. Rate reductions must be made in time, but they must be made intelligently and with full consideration for the deficits which the utilities have accumulated as the result of the slowness with which increased rates came. In this consideration, the commissioner mentioned six things which, he said, must be brought home to the public:

(1) That the average increase in utility rates during the last four years has been substantially less than the increase in the price of other necessities; (2) that the utilities generally have earned less than a fair return on their sound valuation and that they should now be permitted to recoup reasonable losses; (3) that existing rates are not based on peak war costs and therefore that considerable reduction in prices of commodities will have to be experienced before these prices reach the present basis of present rates; (4) that during these four lean years there has been an immense accumulation of deferred maintenance which must be taken care of; (5) that $100,000,000 should be expended in the next two years in Indiana to provide needed extensions and improvements, and the public should know that this money cannot be had unless the credit of the utilities is restored through better revenue; (6) that the situation demands a sympathetic understanding of these facts on the part of the public.

Mr. Haynes said that rates must come down after a while to a level corresponding with what shall be considered normal prices of commodities, but that reduction in rates cannot be expected simply because some one reads in the morning paper that prices are coming down and hastens to demand that utility rates be adjusted accordingly. Even if the selfish interests of the utilities are eliminated altogether, still, in the best interests of the people, rates should not be reduced immediately. He contended that it is the duty of a commission to see that the utilities are not only solvent but that they are maintained in a healthy condition, with good credit and able to give good service. He also said that the utility that renders better service and has a high regard for the public served should be rewarded liberally. Service is the primary obligation of the utility, and it must precede every other consideration. The commission cannot do its part unless the utility does its part in giving service, with open and aboveboard practices. He contended that service first should be the watchword of the utilities and thought that the public would respond to the needs of a company if it is thought that this company is doing its best and really striving to meet the needs of the public and be a real public servant.

ADDRESS OF MARTIN J. INSULL

Martin J. Insull, president of the National Electric Light Association, spoke at length with the primary object of telling the utility operators what they ought to do and say to the public. Speaking of the attitude of mind of utility men and the public, Mr. Insull said that most of us think that running the utility is our business and the public thinks that it is none of its. Both are wrong, he contended, and he then endeavored to urge upon the utility man the idea that he must make it a part of his duty to spread information about the utilities to the public and make the public understand that it has a real interest in the utility business. He took issue with Commissioner Haynes that service must be the first and foremost consideration. It was his opinion that service and rates must go together, for it is impossible to give service unless reasonable rates can be charged. He made the point that people do not think much about the service received until it becomes poor service. The public is so accustomed to good service that it has no thought of this matter until the time comes when it receives poor service, when it is prompt to voice its discoveries.

Mr. Insull then brought up the question of what it would mean if the utilities should shut down, and discussed what the utilities mean in modern business and domestic life. He made the observation that if the utilities in a community are all run down it is safe to say that the community itself is going backward and there is something decidedly wrong with it. The growth of a community and of its utilities go together; in fact, the utility growth should be a little ahead of that of the community.

He said that now is the psychological time to educate the public, and emphasized that not all of this work can be done through the printed word, but that a lot of it must be done by word of mouth. He referred to the treatment received by the railroads and pointed out how disastrous and costly to the people, as well as the railroads, this policy had been. He thought if the utilities are to receive a similar treatment the cost to the public will be even greater. He reiterated the statement of Commissioner Haynes that the utilities should be allowed to carry present rates for a while in order to offset the long period during which they were using up working capital, or living off their fat, so to speak. In their effort to take care of public demands, they used up all of their reserves and rapidly reached the point of losing their credit.

He compared the rapidity with which money is turned over in an ordinary merchandising business with the slow process which takes place in the utility field, and contended that as a result of this there is no real profit in the utility business. There is no surplus to be put aside and all new extensions of service must be financed out of new money brought into the business from outside. But in the money market, which is very highly competitive, the utility finds it necessary to compete against the highly profitable merchandising and industrial businesses.

Mr. Insull said that the National Electric Light Association is now launching a national campaign of good-will advertising in an endeavor to educate the public that the utility business is their business. The public controls the rates, the service, the security issues and the valuation of the property, and is either directly or indirectly an investor in the utility. Then he asked in closing: Is the utility business not the public business?

ADDRESS OF E. K. HALL

E. K. Hall, vice-president American Telephone & Telegraph Company, then addressed the assembly in a speech that was replete with humor and able suggestions on how to make the public understand the true situation in the utility field. In describing how completely the life and business of every community is built around its utility service, Mr. Hall compared the utilities to the elevator service in the famous Woolworth Building in New York. He spoke of the beautiful architecture of this wonderful structure, but said that the value of the building as a business enterprise rested entirely upon the elevator service, and that without this it would be just a monument. Most communities do not realize how badly they need utility expansion and improvement, and practically all utility companies are now without the money to give the service the public wants in its own interests. This means that the utilities need more revenue in order to get more capital, and the only way this can be had is through better rates. But higher rates are hard to get. Why? Because the public says the service is not good enough to warrant increase in rates. The utility then determines to boost up the service and tells the public that it will, but finds that it cannot do so because it cannot get the money necessary. Hence the company is back where it started at the beginning of another form of vicious circle.

Four Fundamentals According to E. K. Hall

1. The interests of the public and utility companies are identical. Few people understand this. It means co-operation.
2. The business of the utilities is entirely different from that of unregulated corporations. There is no such thing in the public utility business as profits in the ordinary sense.
3. The only possible danger as to rates from the public point of view is that they may be made too low. If too high, the fact is easily seen, but if too low it reacts against the public interests. If there is any doubt about the rate, let the decision be made on the safe side.
4. The utilities must have good credit if they are to keep ahead of the growth of any community. Good credit is the result of a fair return on the investment, plus a margin for safety in case of adversity.

Mr. Hall then raised the question of what is the key to the situation, and said that the answer was easy. If the utility operators could wave a magic wand to solve their greatest need, they would have it produce a unanimous understanding on the part of the public, for if this were had it would immediately say to take care of the utility companies. But how can the public be made to understand? This is the key, and we have the knowledge and information to do it, and in fact have been trying to tell the public for some time, but the public does not understand because it does not believe us. In the case of the railroads, he said, they had to wait until the whole transportation system broke down before the public would believe there was not a "nigger in the woodpile."

Raising the question, then, of why the public does not believe us, Mr. Hall pointed out that the public viewpoint is entirely different from ours. He said that we did not get wise ourselves to what our job really is until the last four or five years. Prior to that time we thought that our job was to sell telephone instruments and electric light bulbs, but now we know that what we are really selling is service. He said that the manufacturers were partners in this lack of understanding, for they were pushing the business in order to sell more instruments and supplies. They wanted to make dynamos and sell them, but did not care whether they were used in giving service to the public afterward or not.

Furthermore, he said, the art of all of the public utility businesses is very young. No one visualized the field ahead very clearly. And through the development of the art mistakes were made. Many of the utilities put things over on the public and got themselves and the honest utilities as well in wrong. We have been paying the bills resulting from these mistakes ever since. Consequently, when regulation came it started with a hostile attitude. The public conception of regulation at the time it went into effect was (1) to see that no rates were excessive (and the public thought that all rates were excessive and we were not wise enough to explain they were not), (2) to prevent unjust discrimination, and (3) to prevent the waste, unsightliness and inconvenience of competitive utility systems.

Mr. Hall compared the position of the utilities when regulation thus came to what a similar situation would mean to a merchant if told that three of his customers were going to begin tomorrow to fix prices on all his goods for the rest of his life. Mr. Hall said this merchant would have a fit; in fact, he was not sure but it would kill him. Yet this is what the utilities have had to submit to.

Whatever reason there was to regulate the utilities downward and restrict their operations, he said, was taken care of in a few years, and completed a long time before the war. Then we had to stand by during the war and permit the very lifeblood of these businesses to be sapped. Profiteers were plentiful in every other line of business and the public had to put up with exorbitant prices all around without recourse, but not without resentment. Then when the utility companies asked for higher rates, the public immediately took the attitude that at least here is one fellow that won't get a chance to profiteer. In other words, the resentment at the real profiteers was taken out on the utilities, who were farthest from being profiteers.

Mr. Hall said that it takes a long time to change a lifetime of opinion, and this is the problem the utilities now face in changing the general public impression of the utility operators. He said we must patiently, intelligently and tactfully get the facts before these people during the next five years, and then forever keep the facts before them. It must be brought home to the public that it is through with its job of "spanking the utilities." They have been made to suffer in full for whatever transgressions they were guilty of. He commented that at last the public utilities in one state have awakened to their jobs. In Indiana, at least, they have all got together to talk a common language and to work together in this common problem of public relations.

If there is any utility company that is not now ready to play fair and square with the public, it is the job of the honest utilities to bring this one into line summarily. If we do not, the public will, and will punish the rest of us at the same time.

One of the problems of the utilities is to make the public see that the whole idea of regulation is moving into the second era. The punitive era, the era of teaching the utilities to be good, has gone by and few companies are using any unfair practices now. The second era, or that of making and keeping the utility companies strong enough to do their work, is now here. This must be the era of co-operation between companies and public, the era of understanding with the removal of distrust. This is the era that we are coming into and there are many ways to hasten it as a reality.

To better public relations means to better public opinion of the utilities. This public opinion is the court of last resort, and we want it to know our problems and believe in us. The right conception of our job is to give service of the kind the public wants. But in trying to mold public opinion, Mr. Hall thought that we have not started near enough to the bottom of the situation, that we need to talk fundamentals and then the details will come easy. He considered that there were four fundamentals, upon which, if agreement between public and utilities could be secured, there would be the basis of rapid progress in the understanding of the public. His ideas of these fundamentals were as follows:

1. The interests of the public and utility companies are identical. Few people understand this. It means co-operation.

2. The business of the utilities is entirely different from that of unregulated corporations. There is no such thing in the public utility business as profits in the ordinary sense.

3. As to rates, the only possible danger there is from the public point of view is that they may be made too low. If they are too high this fact is easily seen, but if they are too low it takes the heart and flesh out of the business and reacts against the public interests. In any event the chance of crippling the utilities should not be taken, because this is against the public's own interests. If there is any doubt about the rate, let the decision be made on the safe side.

4. The utilities must have good credit if they are to keep ahead of the growth of any community. Good credit is the result of a fair return on the investment, plus margin enough so that people not already investors in the business, in looking over the company's securities with a view to investing, will see that the companies can stand a little adversity, that there is a little something over for safety.

HOW TO BETTER PUBLIC RELATIONS

Before making some suggestions as to how best to handle the problem of educating the public, Mr. Hall pointed out a few suggestions on how not to do it. Do not wait, he said, until you are up against it, until the only story you have to tell is a sad story, for this breeds suspicion. Do not try to get favorable public opinion until you have cleaned house and deserve it. Do not try to assign the task of informing the public to one man with that as his special job. No one man alone can accomplish much, and it is essential that every officer and every employee do a part. Do not leave the task to publicity alone. This is good if rightly conducted, but it must be supplemented by word of mouth and other means of education.

The place to begin the big task of inducing favorable public opinion is at home. It is impossible to accomplish much unless the whole organization family thoroughly understands and is ready by training and willing in mind to spread the truth. Another very important point is to study and proceed from the public point of view. We have not told the public what a task it is to give service, and it has no conception of the magnitude and intricacy of the work behind this service. It thinks that "it is a cinch."

Mr. Hall said that the public thinks the rates are too high because (and this is a commentary on the public) individuals think that if they were in the business they would make the rates too high. A difference of opinion also arises because the public thinks in terms of today, while the utility operators must think in terms of the future. The public will seek an advantage for today without regard for the result in the future. The problem of good relations is largely a question of mutual confidence. Mr. Hall contended that the public is 90 per cent on the square if it has the facts. The crank politician does not represent the public and it is part of our job to bring this fact into the public light. The public must also be taught to distinguish between the companies that are doing the fair thing and those that are not. The public does not have time to learn all of the details of our business, but good treatment and thoughtful consideration will go a long way toward making up for what lack of knowledge there will be.

There is a hazard in every business, continued Mr. Hall, which measures the amount that that business has to pay for money. The utility business is not subject to many of the hazards common in other lines. The principal hazard in the utility business is that it is run on such a small margin that an increase in operating expenses may wipe out the margin and put the company in difficulty before the machinery for changing the rate can be made to function.

Mr. Hall's final message to the utility men was to stop sobbing and apologizing. He said it is time to take the aggressive, that we are in a great service, that we have a real story to tell, and that we should tell it to employees and to the public and tell it now.

SPEAKERS AT THE EVENING SESSION

At the dinner in the evening Mayor Charles W. Jewett of Indianapolis spoke briefly. He said that the time had gone by when a man can stand on a dry goods box and deride the public utilities. Such a critic fails to appreciate how fundamentally necessary the service of the utilities is and he does not see that they cannot serve if they are financially crippled. The appreciation of the user of utility service will be advanced as he is brought to understand the significance of this service. He congratulated the utility men upon the organization of the Indiana association to work along this line, and he believed that it would result in great good to the people of the State as well as the utilities. He said that the public authorities and the utilities must work hand in hand for the development and progress of the communities.

Charles A. Munroe, president American Gas Association, spoke briefly on the fundamental necessity for understanding between public and companies. He said that in the beginning of regulation the reduced prices which were ordered enabled the companies to sell more of their product, and while it worked out in favor of the customer, it also was not altogether detrimental to the companies until the time came when operating costs began greatly to increase. People do not understand the fundamental factors of the utility business, and they do not believe that a utility is content to earn only 8 per cent; that in reality it must be earning more than this. This distrust must be overcome, for the welfare of cities and states is dependent on the financial welfare of their utilities. The utility services which were the luxuries of yesterday are the necessities of today. These companies cannot charge rates which will yield in excess of 8 per cent. On such rates they cannot develop the property out of earnings. The development of a utility must come from new money derived from the sale of securities, and this means that good credit must be assured.

Philip H. Gadsden, president American Electric Railway Association, then made the closing address of the meeting. This was published in abstract in the Jan. 15 issue of this paper, page 137.

ELECTION OF OFFICERS

During the afternoon a short business session was held, at which Thomas Donohue, secretary of the association, reported briefly on the work of the Indiana Committee on Public Utility Information, which has been the principal activity of the association during the past year. The reports of the committees on constitution and nomination of officers were also read and adopted. The following officers and members of the executive committee were elected for the following year:

President, Charles L. Henry, president Indianapolis & Cincinnati Traction Company, Indianapolis, Ind.; first vice-president, S. E. Mulholland, vice-president Northern Indiana Gas & Electric Company, Ft. Wayne; second vice-president, F. J. Haas, vice-president and general manager Public Utilities Company, Evansville, Ind.; secretary, Marshall V. Robb, treasurer Wabash Valley Electric Company, Clinton; treasurer, Charles C. Perry, president Indianapolis Light & Heat Company. In addition to these officers the other members of the executive committee are Harry Reid, Louisville, Ky.; Frank O. Cuppy, Lafayette; Thomas Donohue, Lafayette; Fred Bryan, South Bend; Frank Wampler, Indianapolis, and C. L. Kirk, Indianapolis.

Two New Buses for San Francisco Municipal System

TWO new buses have just been received by the San Francisco Municipal Railway to supplement and serve as spares in connection with the bus service maintained by that system. The new cars, which were built by the Meister Machine Shop of Sacramento, are mounted on White automobile chassis provided with a 45-hp. motor. They have a seating capacity of eighteen and driver, and when ready for service weigh about 8,000 lb.

In general, the design and arrangement of the new buses is very similar to those which have been in service for some time and which were described in the ELECTRIC RAILWAY JOURNAL for Feb. 16, 1918. However, a number of minor improvements have been introduced in the new cars which are expected to make for somewhat better economy and service.

As the buses were found to average only about 5 to 6 miles per gallon of gasoline, the 24-gal. tank, provided on the earlier model buses, was considered too small and 35-gal. tanks were installed on the new buses, these being expected to serve for the entire day's run. The lamp hangers mounted on the rear of the old buses are replaced in the new design by lamps set flush with the body. This eliminates the danger and breakage resulting from boys on bicycles hanging on to the buses. The headlights have been moved back to the dashboard as a means of reducing maintenance.

No tire racks are provided on the new cars as it has not been found worth while to carry spares. The driver of the bus, working alone, requires so much time to change one of these large tires that it has been found more economical to send out a small service truck from the garage to make a change when necessary. However, less tire trouble is expected on the new cars because they are equipped with single 40-in. x 8-in. tires on the rear end, in which the rubber and fabric protection is such that punctures are very infrequent.

On the old plan the cost to equip one wheel with dual tires was as follows:

Two tires, 37 x 5 in. at $81.59	$163 18
Two tubes, 37 x 5 in. at $10.00	20.00
Total	$183.18

On the new plan, which is expected to be more economical, the cost to equip one wheel with single tire is as follows:

One tire, 40 x 8 in.	$217.00
One tube, 40 x 8 in.	25.00
Total	$242.00

Stockholm-Gothenburg Railroad to Be Electrified

THE Swedish Government has decided to electrify the Stockholm-Gothenburg division of the State Railways and has appropriated about $5,000,000 for the work to be done during 1921. The division is about 300 miles long and its electrification will require a total expenditure of about $25,000,000. Although the Riksgransen division, which is already electrified, operates at 15,000 volts, single-phase, it has not been definitely decided whether the new electrification will use alternating or direct current. In order to determine this and other factors which are unsettled a royal commission is now studying the railroad electrifications in this country. A. Granholm is director general of the Swedish State Railways, I. Ofverholm is chief electrical engineer and A. Enstrom is director of the Scientific Engineering Academy of Sweden.

Turning Seats on Passenger Trains

SHALL passengers be permitted to turn seats over and place their feet upon seat cushions? This question was one of those affecting the public's comfort brought up at a meeting of the operating staff of the Pennsylvania Railroad. The decision was as follows:

"When there is not a whole seat for every passenger, trainmen should see that seats are not turned over and an undue amount of space monopolized by any one passenger. To go further than this, however, and forbid the turning over of seats, when there is plenty of room, is unnecessary.

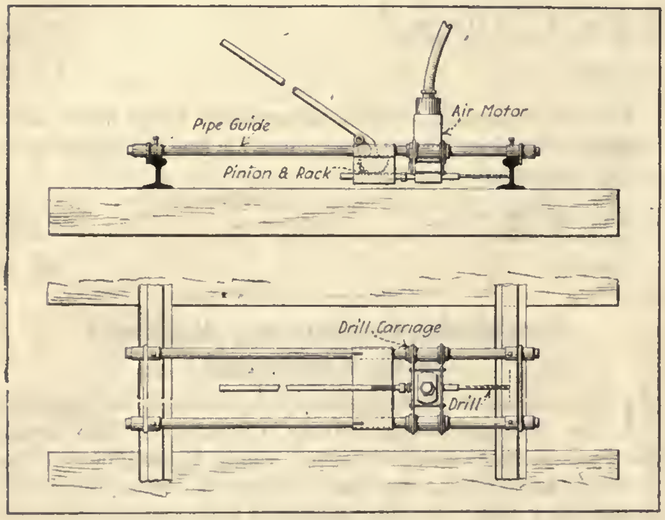
"After all passengers have been provided with seats, conductors will exercise their judgment in permitting the turning over of seats. Passengers should be required to exercise proper care to prevent the soiling of seats in placing their feet thereon."

A recent preliminary report of the Wisconsin Railroad Commission, covering the whole State, states that the electric railways, property and plants accounts in 1910 totaled $51,148,324 and in 1919 $84,714,942. The total operating revenues amounted to $8,823,996 in 1910 and to $15,784,993 in 1919.

Speeding Up Rail Bonding

Air-Operated Drills Receiving Power from Gas-Engine Driven Compressor and Mounted on Carriage Make Possible Bonding of Eighty Rails per Hour on Chicago, Milwaukee & St. Paul Railway

ON THE Chicago, Milwaukee & St. Paul Railway an expanded terminal type of bond was used which required two ⅞-in. holes through the web of the rail for each bond. The drilling was done with two air-operated drills, which received their power from a gas-engine-driven compressor. This compressor was an "Imperial" Ingersoll-Rand type on a four-tool compressor car, originally designed for operating tie tampers. Two air tanks, 16 in. x 48 in., were added to this outfit in order to secure a more uniform pressure and better engine operation. While the drills were operating an air pressure of 55 to 60 lb. was maintained at the reservoir of the compressor which furnished power for two drilling motors.



PIPE-CONSTRUCTED FRAME FOR DRILLING RAILS

The drilling machines were close-quarter drill motors, mounted on a frame consisting of two 1¼-in. pipe guides extending from rail to rail. These were separated at the ends by two clamp plates of sufficient depth to prevent the frame from slipping over the head of the rail. The drill motor was supported between the guides by two transverse plates separated by sleeves which slide on the pipe guides. The drill feed consisted of a long lever with a gear segment acting on a rack. A downward pressure on the lever forces the whole carriage along as the drill bores through the web of the rail. The whole frame was supported on four set-screws, one in each corner, resting on the head of the rail and furnishing a means of adjustment and leveling the frame.

With an outfit of this type a hole can be bored in an average rail in about twenty-five seconds, but in harder steel it often takes forty to fifty seconds. Some difficulty was experienced with extremely hard steel in the rails. It was found necessary to use care in selecting the drill bits, otherwise there was considerable trouble due to breakage and difficulty in regrinding. One man was retained at the shops for regrinding drills, which operation required careful attention in order to secure bits which would give uniform diameter of holes.

The drill motors were connected to the compressor with a 50-ft. and a 75-ft. section of ¾-in. armored air hose. With this hose each drill could work on two joints for each movement of the compressor. To clear the track for train movements the air compressor was jacked up and rolled clear on skidways. The average bonding rate was about eighty per hour, and as many as 110 have been placed in an hour. The best record was 629 bonds in seven hours and twenty minutes' drilling time. The actual drilling time averaged about five and one-half hours per day, the lost time being due to going to and from work, clearing the track for trains, etc. This time would vary considerably with other working and traffic conditions. For one compressor the usual bonding crew consisted of twenty-one men, including the foreman, drillers, helpers and others required for the complete bonding operation.

Convenient Track Measuring Device

THE device illustrated herewith was used by an electric railway to check the track mileage of the system. An obsolete single-truck passenger car was used and the cone was turned from the tread of one of the wheels so as to give a flat surface. A wooden wheel mounted as shown in the illustration was fitted with a rubber tire and adjustments were made so that the circumference would measure exactly 10 ft. This wooden wheel was arranged to bear against the car wheel and be driven by it. By this arrangement the distance traveled by the circumference of the wooden wheel would be exactly equal to the track distance. The frame supporting the wooden wheel was weighted in order to increase the friction between the driving and the driven wheel. The axle of the wooden wheel was connected by a flexible shaft to a counting device taken from an old kilowatt-hour meter. Each revolution of the wooden wheel caused the first dial of the meter to make one revolution and as this represented 10 ft. results could be read directly. In order that there might be no tendency toward slipping between the car wheel and the track, the brushes were removed from the motor on that axle to which the measuring device was attached and the car was operated with one motor.

CONVENIENT TRACK MEASURING DEVICE

A check of the results obtained showed that on tangent track these were as close as 1 ft. in 5,000. Curved special work was measured with a tape, measurement being taken at the points of tangency of the layout. With this device it was found that results sufficiently accurate for the purpose desired were obtained.

About 2,000 of the original white cedar ties laid in 1869 by the Chicago, Milwaukee & St. Paul Railway between North Milwaukee and Cedarburg are still in use today. For untreated ties this is an excellent record. For the first thirty-three years of service, or up to 1902, the ties did not have even the protection of tie plates.

22-Year-Old Track in Good Condition

Track Consisted of 72-Lb. T-Rail Laid on Michigan Hemlock Ties Which Had Been Pressure Treated with Creosote —Rail Also Showed Little Deterioration After This Long Service

By W. L. Whitlock
Superintendent of Way the Denver (Col.) Tramway

WE RECENTLY had occasion to open up some track which was built in July, 1898, and were much impressed by the soundness of the ties and condition of the rail after twenty-two years of service. The track in question was a tangent double track, 3-ft. 6-in. gage, constructed for a distance of 7,700 ft. on Colfax Avenue, from Broadway to York Streets. It was laid with 5-in. x 8-in. x 6-ft. Michigan hemlock ties which had been pressure treated with creosote oil using 12.5 lb. per cubic foot. They were so soaked with oil that if stood on end the oil would run out. These were laid on 6 in. of pit-run river gravel ballast and concreted in up over the base of the rail. The 72-lb. T-rail, Lorain Section No. 331, was fastened to the ties with $\frac{9}{16}$-in. by 4½-in. cut track spikes and the joints completed with six-hole angle bars, 1-in. track bolts and tie plates. When installed the tie plates were pressed into the ties according to a template and the ties transported to the job with the plates in place. The four ridges on the plates helped to fasten them to the ties. The tie plates and bottom and sides of the rail were coated with asphalt paint as protection against the alkaline soil. The street was paved with asphalt, with basalt blocks on either side of the rails and vitrified brick nose blocks in the flangeway.

APPEARANCE OF TIES AND RAILS IN TWENTY-TWO-YEAR-OLD TRACK

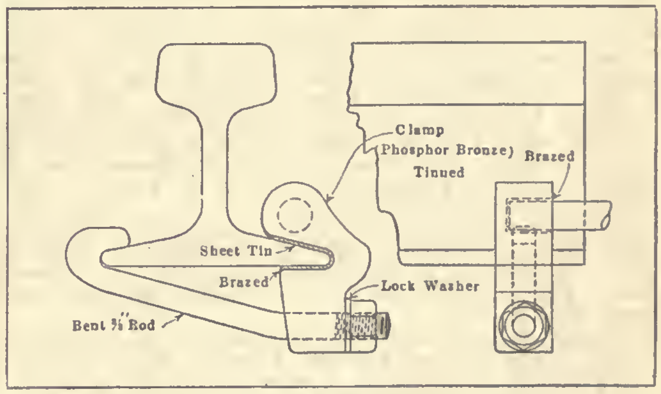
RAIL IN UNUSUALLY GOOD CONDITION CONSIDERING LENGTH OF SERVICE

Upon removal of the pavement it was found that the ties were soggy on the outside but sound in the heart. The tie plates were in excellent condition and the spikes had to be pulled out with claw bars. The rail was found to be in good condition except that the base had commenced to show signs of deterioration from rust. The head of the rail was measured with a micrometer at several points, ¼ in. back on the gage side, and it was found to be uniformly $1\frac{3}{32}$ in. thick, indicating a head wear of $\frac{5}{32}$ in. in twenty-two years.

This track is on one of the heaviest traveled lines of the Denver system. While the soil and climatic conditions in Denver are favorable to long track life, the condition of this work demonstrates that a track made with treated ties, tie plates, heavy rail and good waterproof paving pays in the end. It also brings to our attention the necessity of strict inspection during construction work.

Detachable Rail Bond

A TYPE of detachable rail bond shown in the accompanying illustration is being placed on the market by the National Electric Company, Charleston, W. Va. It consists of a phosphor bronze clamp coated with tin, which is gripped to the rail flange by a bent rod. A strip of block tin insures good contact between the rail and clamp and these latter are connected together with stranded copper cable. Clamps are furnished either with or without the cable as desired. The special features claimed for this clamp are its ease of installation and removal and the advantageous position afforded for the connecting cable close to the track and free from interference.



DETACHABLE TYPE OF RAIL BOND

Terminal Markings for Electrical Apparatus

THE American Engineering standards committee has under consideration the standardization of terminal marking for electrical apparatus and has designated the Electric Power Club as sponsor for this purpose. At the Brussels meeting of the International Electrotechnical Commission, held in March, 1920, some of the European delegates proposed a method for marking terminals for transformers and, as the American delegates suggested that it would be preferable to treat the more general subject of terminal markings for electrical apparatus consistently, they were requested to propose a systematic plan for the whole subject. It is hoped to secure agreement of all interested bodies on a general plan, which can be worked out to minimize confusion and insure uniformity.

Association News

Notice About the Banquet

THE speakers at the dinner to be held in Chicago on Feb. 10 will be as follows: President Philip H. Gadsden, Hon. John W. Weeks, former United States Senator from Massachusetts; Hon. James H. Wilkerson, former chairman Public Utilities Commission of Illinois, and Charles A. Leedy of the Youngstown *Telegram*. The dinner will be served at 7 p.m., preceded by a reception at 6:30. The tickets are $10 and the tables will seat ten each.

American Association Committee Appointments

FOLLOWING are the principal American Association committees (with the exception of the Committee of One Hundred) together with their respective memberships:

Committee on Company Membership—F. R. Coates, Toledo Railways & Light Company, Toledo, Ohio, chairman; Benjamin Adams, St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo.; J. P. Barnes, Louisville (Ky.) Railway; H. F. Dicke, Utah Light & Traction Company, Salt Lake City, Utah; C. R. Ellicott, Westinghouse Air Brake Company, New York, N. Y.; L. E. Gould, Economy Electric Devices Company, Chicago, Ill.; C. A. Hall, Eastern Pennsylvania Railways, Pottsville, Pa.; E. B. Moore, Monongahela Valley Traction Company, Fairmont, W. Va.; H. H. Norris, ELECTRIC RAILWAY JOURNAL, New York, N. Y.; R. T. Sullivan, Tacoma Railway & Power Company, Tacoma, Wash.; E. M. Walker, Terre Haute Traction & Light Company, Terre Haute, Ind.; E. P. Waller, General Electric Company, Schenectady, N. Y.; E. F. Wickwire, Ohio Brass Company, Mansfield, Ohio.

Committee on Company Sections and Individual Membership—Martin Schreiber, Public Service Railway, Camden, N. J., chairman; H. H. Norris, ELECTRIC RAILWAY JOURNAL, New York, N. Y.; Charles C. Peirce, General Electric Company, Boston, Mass.

Committee on Constitution and By-Laws—Harlow C. Clark, Public Service Railway, Newark, N. J.; Thomas Casey, National Pneumatic Company, New York, N. Y.; Charles L. Henry, Indianapolis & Cincinnati Traction Company, Indianapolis, Ind.; Lucius S. Storrs, the Connecticut Company, New Haven, Conn.

Committee on Mail Pay—L. H. Palmer, United Railways & Electric Company, Baltimore Md.; Charles L. Henry, Indianapolis & Cincinnati Traction Company, Indianapolis, Ind.; G. K. Jeffries, Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.; R. A. Leussler, Omaha & Council Bluffs Street Railway, Omaha, Neb.; Louisville (Ky.) Railway; W. S. Rodger, Detroit (Mich.) United Railway; C. L. S. Tingley, American Railways, Philadelphia, Pa.

Committee on National Relations—Charles L. Henry, Indianapolis & Cincinnati Traction Company, Indianapolis, Ind., chairman; H. G. Bradlee, Stone & Webster, Boston, Mass.; A. W. Brady, Union Traction Company of Indiana, Anderson, Ind.; Britton I. Budd, Metropolitan West Side Elevated Railway, Chicago, Ill.; C. D. Cass, Waterloo, Cedar Falls & Northern Railway, Waterloo, Iowa; Edwin C. Faber, Aurora, Elgin & Chicago Railroad, Aurora, Ill.; W. S. Rodger, Detroit (Mich.) United Railway; Lucius S. Storrs, the Connecticut Company, New Haven, Conn.; C. L. S. Tingley, American Railways, Philadelphia, Pa.

Committee on Publicity—Barron G. Collier, Barron G. Collier, Inc., New York, N. Y., chairman; C. B. Buchanan, Virginia Railway & Power Company, Richmond, Va., Britton I. Budd, Metropolitan West Side Elevated Railway, Chicago, Ill.; W. A. Draper, Cincinnati (Ohio) Traction Company; C. D. Emmons, United Railways & Electric Company, Baltimore, Md.; Horace Lowry, Twin City Rapid Transit Company, Minneapolis, Minn.; Lucius S. Storrs, the Connecticut Company, New Haven, Conn.

Committee on Subjects—J. D. Mortimer, the North American Company, New York, N. Y., chairman; W. G. Gove, Brooklyn Rapid Transit Company, Brooklyn, N. Y.; J. J. Landers, York (Pa.) Railways; J. J. Reynolds, Boston (Mass.) Elevated Railway; J. N. Shannahan, Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va.; J. J. Stanley, Cleveland (Ohio) Railway; R. P. Stevens, Republic Engineers, Inc., New York, N. Y.; Calvert Townley, Westinghouse Electric & Manufacturing Company, New York, N. Y.

Committee on Valuation—Martin Schreiber, Public Service Railway, Camden, N. J., chairman; Prof. H. C. Anderson, University of Michigan, Ann Arbor, Mich.; Cecil F. Elmes, Sanderson & Porter, Chicago, Ill.; Williston Fish, Chicago (Ill.) Surface Lines; G. W. Gillespie, Associated Gas & Electric Companies, Ithaca, N. Y.; J. H. Hanna, Capital Traction Company, Washington, D. C.; W. H. Maltbie, United Railways & Electric Company, Baltimore, Md.; W. H. Sawyer, E. W. Clark & Company Management Corporation, Columbus, Ohio.

Transportation Association Committees Commence Work

THE committee work of the Transportation & Traffic Association for 1921 is under way. The committee on personnel and training of transportation employees held the first meeting at association headquarters on Jan. 18. Among those present were J. P. Barnes, chairman, Louisville (Ky.) Railway; J. E. Wayne, York (Pa.) Railways; John Leeming, Chicago (Ill.) Surface Lines; J. F. Trazzare, Georgia Railway & Power Company, Atlanta, and J. K. Punderford, the Connecticut Company.

The report as planned for presentation at the 1921 convention will include a résumé of the recommendations of previous committees, in so far as such recommendations are not obsolete or unworkable according to present-day practice. This will be prepared by J. E. Wayne. Another part of the report will discuss the advantages that accrue to railways having employment bureaus under the jurisdiction of specially trained executives, together with physical tests and specifications for various jobs. J. F. Trazzare is responsible for this section. A syllabus of mental tests as used by some electric railways will also be included. This section is to be prepared under the direction of John Leeming. Another section which will be prepared under the supervision of Martin Schreiber will bear on the value of the company section as a means of educating employees.

Additional T. & T. Association Appointments

SUPPLEMENTING the list of committee appointments of the Transportation & Traffic Association printed in the issue of this paper for Dec. 25, 1920, page 1297, the following list is given, including also the personnel of joint committees on which this association is represented:

Committee on Merchandising of Transportation—Colonel J. H. Alexander, Cleveland (Ohio) Railway, chairman; W. H. Boyce, Beaver Valley Traction Company, New Brighton, Pa.; F. L. Butler, Winnipeg (Man.) Electric Railway; H. C. Clark, Public Service Railway, Newark, N. J.; F. R. Coates, Toledo Railways & Light Company, Toledo, Ohio; A. H. Ferrandou, Washington Railway & Electric Company, Washington, D. C.; B. W. Frauenthal, United Railways of St. Louis (Mo.); A. L. Kempster, New Orleans Railway & Light Company, New Orleans, La.; M. B. Lambert, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.; A. Stuart Pratt, Stone & Webster Management Corporation, Boston, Mass.; S. L. Vaughan, Grand Rapids, Grand Haven & Muskegon Railway, Grand Rapids, Mich.

Committee on Traffic Regulation—H. B. Flowers, United Railways & Electric Company, Baltimore, Md., chairman; F. R. Cogswell, Pittsburgh (Pa.) Railways; R. F. Kelker, Jr., Board of Supervising Engineers, Chicago, Ill.; W. H. Maltbie, United Railways & Electric Company, Baltimore, Md.; H. B. Potter, Boston (Mass.) Elevated Railway; Fielder Sanders, Street Railroad Commissioner, Cleveland, Ohio; Paul E. Wilson, Cleveland (Ohio) Railway.

Committee on Personnel and Training of Transportation Employees—J. P. Barnes, Louisville (Ky.) Railway, chairman: F. G. Buffe, Kansas City (Mo.) Railways; F. D. Burpee, Ottawa (Ont.) Electric Railway; John Leeming, Chicago (Ill.) Surface Lines; Martin Schreiber, Public Service Railway, Camden, N. J.; R. P. Stevens, Republic Engineers, Inc., New York, N. Y.; J. F. Trazzare, Georgia Railway & Power Company, Atlanta, Ga.; J. E. Wayne, York (Pa.) Railways.

Joint Committee on Economics of Schedules (T. & T. and Accountants)—(T. & T. members) Edward Dana, Boston (Mass.) Elevated Railway, chairman; Donald Goodrich, Twin City Rapid Transit Company, Minneapolis, Minn.; E. H. Ives, Detroit (Mich.) United Railway; H. C. Moser, Fifth Avenue Coach Company, New York, N. Y.; Samuel Riddle, Louisville (Ky.) Railway; J. A. Stoll, United Railways & Electric Company, Baltimore, Md. (Accountant members)—A. G. Neal, Washington Railway & Electric Company, Washington, D. C., co-chairman; C. B. Jackson. Eastern Massachusetts Street Railway, Boston, Mass.; D. J. Strouse, Twin City Rapid Transit Company, Minneapolis, Minn.; J. M. Campbell, Atlantic City & Shore Railroad, Atlantic City, N. J.

Joint Committee on Express and Freight Traffic Promotion and Costs (T. & T. and Accountants)—(T. & T. members) F. W. Coen, Lake Shore Electric Railway. Sandusky, Ohio, chairman; T. G. Brabston, Birmingham Railway, Light & Power Company, Birmingham, Ala.; W. P. Bristol, the Connecticut Company, Hartford, Conn.; J. H. Crall, Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.; R. D. Hood, Massachusetts Northeastern Street Railway, Haverhill, Mass.; F. D. Norveil, Union Traction Company of Indiana, Anderson, Ind.; W. S. Rodger, Detroit (Mich.) United Railway; T. H. Stoffel, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.; C. E. Thompson, Chicago, North Shore & Milwaukee Railroad, Highwood, Ill.; A. F. Van Deinse, Columbus, Delaware & Marion Electric Company, Marion, Ohio. (Accountant members) L. T. Hixon, Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.; A. R. Baxter, Indianapolis & Cincinnati Traction Company, Rushville. Ind.; L. E. Lippitt, Auburn & Syracuse Electric Railroad Company, Auburn, N. Y.; C. K. Savery, the Connecticut Company, New Haven, Conn.; W. K. Zinmeister, Rochester & Syracuse Railroad, Syracuse, N. Y.

Joint Committee on Safety Work (T. & T. and Claims)—(T. & T. members) E. C. Spring, Lehigh Valley Transit Company, Allentown, Pa., chairman; W. H. Boyce, Beaver Valley Traction Company, New Brighton, Pa.; G. E. Deibert, Georgia Railway & Power Company, Atlanta, Ga.; C. B. Scott, Chicago Edison Company, Chicago, Ill.; E. M. Walker, Terre Haute Traction & Light Company, Terre Haute, Ind. (Claims members) R. E. McDougall, New York & Harlem Railroad, New York, N. Y., co-chairman; H. K. Bennett, Eastern Massachusetts Street Railway, Boston, Mass.; H. V. Drown, Public Service Railway, Newark, N. J.; C. G. Rice, Pittsburgh (Pa.) Railways; W. F. Weh, Cleveland (Ohio) Railway.

Progress in Highway Traffic Regulation

A DECLARATION of principles to serve as a basis for state highway traffic regulation was adopted in Washington Jan. 12 after a conference attended by representatives of nineteen interested national organizations, including the American Electric Railway Association. In addition, a complete uniform traffic bill was drafted. This draft now goes to the individual associations for approval or suggested changes. Neither the act nor the statement of principles conflicts with the code of traffic principles adopted by the American Electric Railway Association in October.

Among the other associations represented were the American Automobile Association, the American Railway Association, the International Association of Chiefs of Police, the National Safety Council, the National Workmen's Compensation Bureau, the Tractor and Thresher Department of the National Implement and Vehicle Association, etc.

Letter to the Editors

The Field of the Trackless Trolley

MOUNT VERNON, N. Y., Jan. 15, 1921.

To the Editors:

As you have pointed out in recent issues, the British and continental operators are far ahead of American operators in the exploitation of the trackless trolley, which J. B. Hamilton, general manager Leeds Corporation Tramways, has felicitously termed "putting down a tramway on the installment plan." Nevertheless, in spite of the more favorable conditions abroad, the trackless trolley has not made any perceptible dent upon the foreign street railway, and up to the sensational postwar advances in motor fuel it had not thrown much of a scare into the gasoline motor bus. In analyzing the causes for this, one must conclude that a primary one is that most of the trackless trolley pioneering was carried on by firms which did not manufacture standard railway motor and control equipment. They offered the electric railway man apparatus which was decidedly different from the head down to the feet, so that the argument of interchangeability, standardization and minimum parts as compared with gasoline buses lost much of its force.

It is in apparent recognition of the equipment factors set forth that one of our large American railway motor and control manufacturers in bidding upon an Asiatic installation, which is already making a success of the trackless trolley in narrow streets, laid out the following arrangement per bus:

One standard 25-hp. or 40-hp. railway motor without gear, pinion or gear case and with the axle-cap brackets cut off, to be suspended on the chassis of the automobile truck with the armature shaft connected to the driving shaft with a universal joint and worm gear reduction.

One rheostatic controller.

One wooden trolley pole with the base mounted in a socket adjacent to the motorman and with two contacts connected by flexible cable to the controller, so designed that the pole can be raised and lowered or swung to one side of the car by a handle of about the same size as those used for hand operation of car doors. Such a pole would be adapted for use on trolley wires carried 14 ft. to 18 ft. above the ground.

Although, as noted, the foregoing was embodied in a bid for a foreign city, there is no reason why the same scheme would not be satisfactory for American conditions if it can be shown that the trackless trolley is more desirable and more economical than either the trackway or gasoline. Let us see where it would fit in.

In his recently completed* studies on "The Place of the Bus" the writer set forth the conditions where motor bus operation was preferable to the electric trackway, whether such operation was intended to be self-sustaining or simply to minimize the losses incident to operating the "suckers" and byways of a co-ordinated system of mass transportation. Emphasis was also placed upon the fact that the gasoline bus can be shifted around from route to route as traffic conditions change and that it can serve also to reinforce the service on standard trolley routes by making use of parallel streets or of short cuts between workplaces and home. For any shifting conditions, consequently, we must grant that the self-contained power vehicle stands in a class by itself. Of course, there is sometimes a fighting chance for the storage battery bus where power is to be had at extremely low prices and where the question of schedule speed is not a factor in building up or meeting traffic, but on the whole the gas bus is the right bus for fluctuating services.

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*See ELECTRIC RAILWAY JOURNAL for Feb. 28, April 3, April 24, May 29, July 3, July 31, 1920.

With regard to extensions of long-established car routes, the choice between gas bus and trolley bus obviously should depend upon the density or rather the thinness of the patronage. Such service might well begin with the gas bus at long intervals, continue with the trackless trolley at shorter intervals and conclude with the orthodox article. It is always well to bear in mind that the absolutely foot-loose character of the self-contained motor bus insures the operator against any heavy loss of investment. There is no track to pull up, no wires to take down nor even a carhouse to remove, because a gas bus does not need a wholly special building for its retiring place. The buses themselves will always find use in some other place.

It will occur to many, in view of the staggering cost of track construction, track upkeep and paving taxation, that the trackless trolley ought to have a large field in future city transportation over paved streets. There is reason to believe that such a service with moderate traffic would cost less than either track or gas, be quicker and safer than gas buses because of the possibility of using the labor-saving and door-step interlocking devices of modern electric cars and be more acceptable to the rider because of cleaner, brighter and cheaper service.

The fly in this ointment is the retention of poles and overhead wires. It having been demonstrated by the motor bus that these permanent obstructions are no longer essential to transportation over city streets, we may expect the same line of objection to operating trackless trolleys through residential, and even business, streets as in the past when there was no other alternative than the prohibitive conduit system. There is logic in the assertion of the civic welfare man that at least a part of a municipal transportation system should be fluid so that the community will not be forever compelled to grow along the routes made to fit conditions now obsolescent. Hence, public sentiment, as well as relative construction cost and fares, is bound to determine the character of additional transport facilities, even if the trackless trolley is cheaper and safer.

But no matter what happens in city practice, any worth-while trackless trolley has a large opportunity in the conversion of existing highway trolleys and a fair chance for any new intertown transportation which does not make use of a railed right-of-way. Now it may sound fantastic to talk of replacing the old, reliable track trolley with the trackless breed, yet consider the change in its status that is being wrought by the development of the private automobile and the motor truck.

Fifteen to twenty years ago thousands of miles of single-track trolley lines were built alongside of dirt highways in New England and the Middle Atlantic States especially, whereas the Central and Western States were enabled, because of cheaper land, to build roads on private right-of-way. In the course of time part of this highway trolley mileage has been converted to suburban and city trackage through the growth of towns. The greater part, of course, is still in open country, but instead of forming part of a quiet and unpaved dirtway, the trolley strip is frequently the only sign left of the old days. The rest of the road is paved and scores or hundreds of rubber-tired motor vehicles are to be seen for every trolley car.

As the pressure of automotive traffic on these paved highways increases, longing eyes are cast by their users upon the trolley trail, constituting perhaps one-fourth to one-third of the total highway width. In time the voices belonging to those eyes will begin to clamor for more elbow room (to mix the tropes), and if they cannot get it through the costly widening process they will naturally demand that the trolley strip be paved too.

Here is where the highway trolley's cup of troubles, already numerous enough from loss of traffic to private and jitney automobiles, will be filled to overflowing if it attempts to do business in the same old way. Its track upkeep would rise enormously in any case once the track was paved, not to mention the cost of changes in alignment. Even worse would be the later delays due to slow-moving motor trucks settling themselves comfortably between the rails, thereby adding to the schedule losses already suffered in passing through towns and villages and making "meets" on the single-track sections harder than before.

What other way out will there be for the highway trolley so circumstanced than to convert itself to a trackless trolley? At the present selling price of rails and copper, new or old, it may be able to gather almost enough money to buy the necessary buses and to add another wire to the overhead. Its energy consumption will be decreased instead of increased, because a modern bus will weigh wonderfully less than the old-time trolleys found in highway service. Its roadway upkeep tax and a bit added for the multiple overhead should not total more than its track and signal expenses. Yet even if the power and maintenance items should be more, they will be offset many times over by the enormously increased flexibility of the service, for there will be none of the delays and accident possibilities that can be minimized but never entirely eliminated in single-track operation. This same flexibility in passing an opposing trackless trolley bus naturally applies also to going past or around any other vehicle. It follows that trackless trolley schedules can be made faster and more reliable than the single-track line of the past, especially as time will be also gained in passing through intervening communities. Obviously, faster schedules and elimination of waits at sidings will improve public patronage.

A vitally important corollary of such trackless trolley operation is that one-man car operation with approved safety appliances is feasible. Vehicle for vehicle, this would naturally cut down the platform expense. In some cases the wiser policy would be to shorten the headway to build up traffic.

In the case of new transportation facilities over paved country roads the problem is not so clear, because no existing investment or franchise is to be conserved and because the self-contained bus cannot be ignored wherever the amount of traffic to be expected is either small or uncertain. We must figure individually the over-all cost of each kind of service, bearing in mind that it is up to us to determine that critical point of traffic density where the higher operating cost of the gas bus is no longer justified by its unlimited flexibility. And as the same Mr. Hamilton whom I quoted earlier is the proud operator of track, trackless and gasoline transports, I may quote also him at the conclusion of this letter as saying that there is a place for each and every one of these in accordance with the density and permanence of the traffic to be carried. WALTER JACKSON.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION

.PERSONAL MENTION

Transportation Area Planned

Massachusetts Commission Is Looking Well Ahead for the Needs of Metropolitan Boston

That the Boston (Mass.) Elevated Railway take over the Revere and Chelsea line of the Eastern Massachusetts Street Railway for the purpose of improving transportation and bringing about a 10-cent fare between Revere and Boston, as well as Boston and Revere Beach, is recommended by the Public Utilities Commission in a report filed with the Legislature. The fare now from Boston to Revere is 15 cents, and from Boston to Chelsea 10 cents, with no transfers at the Boston end.

EXTEND EAST BOSTON TUNNEL

It is also suggested by the commission that the East Boston Tunnel be extended to Maverick Square or possibly to Central Square, East Boston, and that five-car multiple trains be operated through the tunnel. To extend the tunnel to Central Square would cost something like $2,953,000, it is estimated.

The commission also suggests the possibility of electrifying the line of the Boston, Revere Beach & Lynn Railroad, and by operating trains through the tunnel, under the harbor, secure connection with the rapid transit facilities of Greater Boston.

The work of consolidating the Boston Elevated and Eastern Massachusetts lines, the department believes, could be undertaken through the creation of a transportation district. The investment cost of the Eastern Massachusetts lines in the communities in question was $2,618,000. It is believed that the Boston Elevated Railway could handle the present business of the Eastern Massachusetts Street Railway in Chelsea and Revere without material loss.

LOOKING TOWARD THE FUTURE

One of the big obstacles to the plan, says the report, is the presence of draw bridges at Meridian Street, East Boston, and over the Mystic and Charles Rivers in Charlestown. The average number of openings a day is fifty-six on the three combined. It is because of this difficulty that the extension of the tunnel to Chelsea was suggested.

Continuing its report, the commission says:

> The extension of the East Boston Tunnel would harmonize with the future development of the rapid transit facilities for the district north of Boston and would prepare the way for the next step, which would probably be the further extension of the tunnel under Meridian Street and Chelsea Creek to Broadway in Chelsea, a total extension from Maverick Square of about 1½ miles. An independent tunnel from Boston to Chelsea as suggested would be about a mile longer.
>
> When the capacity of the tunnel as above extended is reached the electrification and extension of the Boston, Revere Beach & Lynn Railroad under the harbor to a connection with the rapid transit system in Boston would then care for all the traffic from Revere Beach and Boston and would relieve the line through Broadway in Revere and Chelsea by connecting with the lines now operated by the Eastern Massachusetts Street Railway in Revere and Beach Streets and in Winthrop Avenue, Revere, and in Bennington Street, East Boston.
>
> This may appear to be a long look ahead, but it would seem wise to measure any proposed development not only by its probable results in the near future, but also by how it would harmonize with a general plan to deal with the conditions which are likely to arise from the growth and development of communities some years hence.

The report states that the consolidation of the lines of the two companies is the most appropriate method of meeting the situation. In conclusion the report says:

> There is no doubt that the orderly development of the Metropolitan street railway system requires that such a consolidation as this should be under the Elevated system and that it is only in this manner that the complaints of the present can be met and the best results can be obtained for the future.

Legislative Relief Sought in California

The Railroad Commission of California will ask the State Legislature, which convened on Jan. 3, to repeal the law requiring electric railways to pave the portions of the streets which they use, according to William Clayton, vice-president and general manager of the San Diego Electric Railway. Mr. Clayton made the statement to the heads of various San Diego civic organizations at a luncheon, at which he explained the problems confronting the electric railways and asked the support of the organizations for the repeal of the law. Should the Legislature pass the bill, electric railways would not be relieved from paving obligations, Mr. Clayton explained, but the municipalities concerned would be enabled to do so by vote of the people.

Mr. Clayton told the business men that the company needed $3,000,000 to $4,000,000 for reconstruction during the next four years, but that no profits are being made, therefore no bonds can be issued. The only money available is the sinking fund and the depreciation fund. Those at the luncheon, representing the chamber of commerce and other organizations, pledged their support to help bring about a solution of the railway's problems.

The present California law requires electric railways to lay and maintain paving between tracks and 2 ft. on each side, and pay to the city a franchise tax of 2 per cent of the gross revenue. Mr. Clayton attacked the franchise tax as unjust, as it is passed on to the persons who ride the cars.

Philadelphia May Reduce

Mr. Mitten, Seeing Wage Cut Coming, Counsels Thrift as Means to Painless Readjustment

"I hope," said Thomas E. Mitten, president of the Philadelphia (Pa.) Rapid Transit Company, in addressing the employees at the annual convention of the Co-operative Welfare Association on Jan. 13, "that as the cost of those things you buy go down, you will reduce your expenses of living proportionately, because we hear that Detroit and Cleveland, which are two of the cities upon which we base our wage rate, are planning reductions, so that in the not far distant future our general committee will have to take that subject up and make such adjustments in reductions as they made in advances, when wages were increased in those cities. If you will only take advantage of the decreasing costs of the things you buy, so that you may cut your living costs down while you are still enjoying the higher wage, it will be a very much easier adjustment to make."

WELFARE ASSOCIATION PROSPERS

At the annual convention C. Edward Hendrickson, department of rolling stock and buildings, was elected president, succeeding William R. Smith. Addresses were made by both gentlemen, as well as by Mrs. Rudolph Blankenburg, W. J. Montgomery, member of the executive committee of the company; President T. E. Mitten and Miss L. M. Roadifer (Miss Safety First).

The records showed that 9,567 employees, or 99.71 per cent, were members of the association. The total subscribers to the saving fund are 7,461 or 79.43 per cent. The annual amount of subscriptions to the saving fund is $1,116,596. About a year ago the company distributed cards on which the men were requested to furnish helpful suggestions. Of those received 300 were considered valuable and more than 30 per cent of them have been adopted.

In the welfare association 118 death benefits of $1,000 each have been paid, and during the twenty-eight months since the association was organized the number of benefits so paid has been 302. Of sick benefits there have been 2,984, or $136,000 in money paid out. There are 114 pensions at $40 a month, to men who had served twenty-five years or are more than sixty-five years of age and unable to perform service. Under the original arrangement the men contributed $1 a month as dues to the association and the company the same sum per man. Last year the company doubled its subscription and this year it will pay $2 per man.

Service at Cost Suggested in Detroit

An Ordinance Along New Lines Will Be Submitted to the Voters at the April Election

Clarence E. Wilcox, Corporation Counsel of Detroit, Mich., has been served by Attorney Stevenson with a copy of an ordinance which the Detroit United Railway proposes to submit to the people at the April election with a view to solving the present railway problem. The ordinance was served as required by the city charter. It embodies parts of plans such as are in effect in Cleveland, and is practically a service-at-cost agreement.

AFTER the ordinance has been approved it will be printed and circulated for signatures. When the requisite number of signatures has been secured the ordinance will go to the Common Council with the request that it be submitted to the voters at the April election for their consideration.

Certain provisions as set forth in the recent proposal to lease the lines to the city are included in the ordinance. The sinking fund clause, which would provide for the accumulation of a sufficient sum to pay for the lines at the end of thirty years and which was opposed by the Mayor and the Street Railway Commission, is included. It provides that 2 per cent shall be taken from the revenues derived from the operation of the cars, to be placed in the sinking fund.

IMPORTANT PROVISIONS OF ORDINANCE

A summary of the important provisions of the ordinance follows:

> The city lines are to be operated by a separate company—Detroit Service-At-Cost Railway.
>
> All existing franchises and rights in the city are to be surrendered except for one or two short lines.
>
> As the city limits are extended from time to time within a larger territory defined in the ordinance the railway lines in the annexed territory come under the ordinance and all franchise and rights-of-way therein except those above mentioned are surrendered.
>
> The rates of fare are to continue as they may be on the day on which the ordinance is voted upon until an inventory and appraisal and audit can be completed. The rates are then to be fixed so as to pay all expenses, costs and charges which the Interstate Commerce Commission in its system of accounts for street railways recognizes as proper, and also such expenses, costs and charges as the city under the ordinance may require the company to incur and pay. In addition the company is to receive 6 per cent per annum on the value of its property used or useful in the public service. The maximum value of the property which was proposed to be transferred by the agreement with the city, of March 17, 1919, is limited to $31,500,000. The rates will go up or down from time to time by increments of one-half cent as conditions may require.

The value of the property and other questions are to be determined under a board of arbitrators.

Extensions are to be built and additional cars provided to any extent that may be directed by the Common Council subject to conditions as to purchase if built within the last ten years. If the company fails to proceed with due diligence and faithful endeavor it loses the 6 per cent until it makes the failure good.

Any municipal lines—subways, elevated or surface—may be required by the city to be equipped and operated by the company, or the company may be required to purchase any surface lines, or if the city operates the municipal lines the company may be required to exchange transfers or cars — that is, cars may be routed over both municipal and company lines. All crossings of company tracks by municipal tracks are to be constructed by the company and the cost paid as determined by the arbitrators.

The routing of cars, frequency of service, heating and ventilation of cars and all similar matters are to be prescribed by the Common Council.

CITY TO HAVE VOICE IN AGREEMENTS

The city is to have a voice in all future agreements with motormen and conductors as to wages and working conditions.

The city has the right to buy the property at the value shown by the inventory and appraisal at the end of any year. The city also has the right at the end of five years, or of any year thereafter, to lease the property at a rental of 6 per cent on the value shown on the inventory and appraisal at the end of such year, the city maintaining the property during the lease, which must run for the balance of the ordinance term—that term being not more than thirty years—but may run for any lawful longer term, at the option of the city, but not exceeding ninety-nine years, and city has right to assign lease or sublet the leased property.

A sinking fund of 2 per cent on the value of the property is to be invested each year by the commissioners in either city or company bonds. If the city purchase the railway payment may be made by converting the sinking fund into cash and turning the cash over to the company and paying the difference.

A budget is required to be submitted by the company to the Board of Street Railway Commissioners early in February of each year.

The City Comptroller and the City Treasurer are to be members of the board of directors of the company.

Mortgages now on the railway cannot be renewed or extended or new mortgages put on without separating the city lines from the lines outside the city nor can all new mortgages on the city lines together exceed 80 per cent of the value fixed by the board of arbitrators, and all mortgages must be payable at any time the city purchases the system.

In 1919 the value of the Detroit United Railway property, then proposed to be purchased by the city, was fixed at $31,500,000—a figure which the company maintains is well under the actual value of the property. Under the initiative ordinance the price to be paid for the same property cannot exceed this sum, but may be less if the property is found to be worth less.

New York Commission Counsels Care

Regulative Body Thinks Haste Should Be Made Slowly in Enactment of Service-at-Cost Measures

Detailed statements in the body of the report of the Public Service Commission for the Second District of New York taken from its general recommendations to the Legislature indicate that increased rates on nearly all the electric railroads in the State have been required during the past two years. Many of the companies have received more than one increase. The commission thinks that on the whole the public response to the necessities of the railroads for additional revenues has been characterized by fairness and good sense.

NATURALLY, says the commission, serious difficulty has been experienced in those municipalities which have contracts with local traction companies legally limiting the rates of fare to levels which the utilities have found to be unprofitable. Many of the communities have waived such limitations and thus conferred jurisdiction upon the commission. In consequence of the situation so presented the commission again urges that it be clothed with such measure of power over such rates as is still possessed by the Legislature. The commission continues to find embarrassment in requiring a full measure of service from railroads, as to which it lacks the power to regulate rates.

In general the commission finds the financial condition of this class of properties far from satisfactory. In the case particularly of suburban and interurban roads the very general use of the private automobile has been found to be an exceedingly grave factor. While this competition also affects the urban roads, its effect upon that class of traffic is much less marked. The commission says:

> Too great generalization should not be indulged in when remedies for existing conditions are sought. It is interesting to note that at its next midyear conference the American Electric Railway Association intends to centralize its attention on electric railway financing, including such features as the proper proportion of capital securities which may be represented by interest bearing debt, and the disadvantage of the present large degree of absentee ownership and control. Individual management, enterprise and efficiency, and the acquisition of the confidence of patrons in the honesty and fairness of business methods, are as important in their results in the public utility field as they are in other channels of commercial endeavor.

Of the service-at-cost plan the commission says:

> Some of the cities have given much study to what is termed service-at-cost plans for urban service, the general design being to regulate fares by an agreement between

> the utility and the city by virtue of which the rates will be expected to change automatically in agreement with the varying income over and above costs of operation, the correctness of the accounting being attempted to be assured by the participation of the city authorities in the management.
>
> This would mean in large degree at least the substitution of so-called automatic regulation for that which is now administered by the commission. It is understood that legislation designed to enlarge the corporate powers of the municipalities as to permit their participation in such plans will be presented to the coming session of the Legislature and that the railroad corporations whose rights are involved are unanimously in favor of such legislation.
>
> While the commission has no inclination to oppose the exercise by the communities of a large measure of home rule with respect to their local utilities we respectfully suggest that so important a departure from a long established policy of regulation of these utilities as may be involved in the proposed legislation should not be adopted without the most careful scrutiny.

The commission recommends that its powers and functions with reference to auto bus transportation be more clearly stated and defined.

Increased fares and heavier traffic, says the commission, were not sufficient to do more than bring the consolidated income statement of the electric railways for 1919 down to a net loss somewhat smaller than for 1918. Expenses increased in but very little greater proportion than revenues and the actual increase is less, so that net operating revenue was 12.8 per cent greater for 1919 than for 1918. Taxes were 8.2 per cent greater, but operating income shows a 15.3 per cent increase over 1918. The gross income, however, was not sufficient to meet interest charges and for the second time in fourteen years the electric roads as a whole show a net deficit, which for 1919 amounts to nearly $3,000,000. The car miles decreased to about 98,000,000, the lowest figure since 1912, but the number of passengers carried increased 713,000,000, the greatest number ever reported. On this point the commission says:

> Of course the exact meaning of this last figure is rather indefinite as a measure of traffic, since it depends on the method of fare collection to some extent, as well as on the actual number of passengers. For example, the introduction of the zone system where there had previously been a single fare might result in two or more passengers being reported for each passenger traveling two or more zones, where previously only one would have been reported. It is not believed, however, from a general knowledge of the tariffs which have been filed with the commission, that zoning accounts for a very considerable part of the increase shown in passengers carried.

The decrease in electric railway mileage between 1918 and 1919 was principally due to abandonment of operation by the Huntington Railroad, which formerly had about 19 miles of first track. The mileage given is, as in the case of steam railroads, only that within New York State, excluding the New York City Line within the jurisdiction of the first district commission, and should not be compared with the revenues, expenses, traffic statistics, etc., which are for the entire operation for the roads reported. No attempt has been made to segregate accounts by state lines.

Only about 11 per cent of the mileage of electric roads reporting to this commission is outside of the State of New York.

Cleveland Seeks Way for Improvements

Company Would Sell Stock at a Discount to Raise Funds for the Carrying Out of New Work

Amendment of the Taylor service-at-cost franchise so as to permit financing through the sale of new stock at less than its par value has been asked of City Council by the Cleveland (Ohio) Railway. The request was made by John J. Stanley, president of the company. In a letter transmitted to Council through Fielder Sanders, City Street Railway Commissioner, Mr. Stanley asks that the company be permitted to sell $3,000,000, par value, of its stock at not less than $80 a share, with the understanding that the difference between the amount at which each share of stock is sold and its par value shall be amortized out of earnings.

CLEVELAND Railway stock has been selling on the market at Cleveland for around $92 a share ever since Cleveland voters, in August, refused to ratify an amendment to the franchise that would have permitted the company to pay dividends of 7 per cent instead of 6 per cent. A provision in the present franchise forbids the sale of stock at less than par.

The City Council is going to hold public hearings on the company's request for authorization of this new method of financing. Company directors have already approved the plan. If the stock is sold at $80, the return to buyers will be 7½ per cent, or ½ per cent in excess of the rate refused the company by the voters in August.

Mr. Stanley says that if the Council permits the amendment the company will immediately purchase fifty new motor cars and fifty new trailers at a cost of about $930,000, will extend its tracks in several of the outlying sections of the city, will build new terminal loops for a number of lines, and will erect new operation stations for the E. Thirtieth, E. Seventy-ninth, Kinsman Road and Cedar Road lines, and will also construct two additional substations.

A part of Mr. Stanley's letter to the Council follows:

> You know as well as I know the present financial condition of this company and of general business. You know that additional tracks, cars, motors, buildings, power equipment and other property are needed. You know that the earnings of the company, at the present rate of fare and at present costs, will not provide a surplus, and that, if there were a surplus, it could not be used for the acquisition of new property.
>
> New property must be paid for by new capital. This means that we must sell more capital stock. Our franchise provides that we must sell it at not less than par and limits the rate of dividend to 6 per cent. You know that we have tried sincerely and earnestly to sell stock in order to raise the money we need—tried in vain.
>
> A year and a half ago I asked the Council to permit us to raise the rate of interest to our stockholders to 7 per cent. The Council declined to do so. The Mayor suggested that the request be submitted to arbitration. A board of arbitration was selected and decided that my request ought to be granted. The Council, it is true, passed an ordinance, but at a referendum on Aug. 10 the amendment was voted down.
>
> It would be useless for us to ask the Council again to amend the franchise so as to permit the payment of 7 per cent or any higher rate on our stock. A rate lower than 7 per cent would not help us.
>
> On many occasions since the referendum you and I have conferred in regard to ways and means of obtaining new capital. No way satisfactory to both of us seemed feasible. Last Saturday (Jan. 8) it was suggested that a franchise amendment be passed that would let us sell some part of our 6 per cent stock at less than par. You seemed to think well of the suggestion and said you would recommend it to the Council. I promised you that I would call a meeting of the company's directors at once and submit it to them for their consideration and advice. They met on Monday morning (Jan. 11).
>
> Skeleton resolutions explaining the plan more fully than I have explained it in this letter were submitted to the directors. They approved the plan. They said that $3,000,000 of stock could not be sold at more than 85, possibly it would have to be sold at 80, and that the amendment ought to permit the sale of that amount at 80. A stockholder who buys our 6 per cent stock at 80 will receive 7½ per cent on his investment in the stock so purchased. This is not an unreasonable rate. It is less than the market value of money at this time.
>
> I request, therefore, that you ask the Council to amend the franchise so as to authorize the sale of $3,000,000 of stock at not less than $80 per share for the purposes and on the conditions stated in the plan that was approved by the directors. Of course, all sections of the franchise that relate to the sale of stock and to the rate of interest should be amended, if the Council approves the plan.
>
> Please explain to the Council that this is not a proposition to permit a higher rate of interest than 6 per cent on the capital stock now outstanding, nor to sell at less than par more than the $3,000,000 of stock that should be sold immediately in order to enable the company to get money to pay for the extensions, betterments and other improvements now urgently needed for proper service. Nor does it mean that any stock hereafter sold in excess of the $3,000,000 shall be sold at less than par or at a higher rate of return than 6 per cent, except with the Council's approval at the time any new offering is made. It is a plan to take us through this time of stress and high money rates. I know of no better one. I know of none so fair to all concerned that has been put into effect by any corporation in any business to raise new capital.

Way Being Paved for New Toledo Grant

Present plans of the Toledo Railways & Light Company, Toledo, Ohio, are to turn over railway property to the Community Traction Company, about Feb. 20, the date of expiration of the ninety-day period allowed by the service-at-cost franchise ordinance for its legal acceptance and preparations for operation.

It had been thought that the company might be ready to operate under the new plan about Feb. 1, but many of the details connected with separating the property have been slow in working out.

At the annual meeting of the stockholders of the Toledo Railways & Light Company on Jan. 20, final action will be taken on the ratification of the new franchise agreement. The Doherty interests of course, control the common stock and they have furnished to the city a written agreement to accept the ordinance.

The board has narrowed down the list of applicants for the post of transportation commissioner to about four.

Seattle Outlook Unimproved

Mayor Insists Municipal Railway Shall Be Self-Sustaining Out of Operating Revenues

Hugh M. Caldwell, Mayor of Seattle, Wash., in a recent letter to George A. Leibes, accountant in the city comptroller's office, expressed himself as opposed to any plan to draw on the general fund or any other tax source to help finance the municipal railway.

The Mayor declares the $15,000,000 in bonds issued by the city in payment for the lines "are not worth anything like $15,000,000," and that immediately the city undertook to pay railway debts out of the tax fund, the bonds "would increase anywhere from $3,000,000 to $7,000,000 in value." The explanation for this statement would seem to be found in the fact that the bonds are a lien on the railway only and if the city is required to maintain the railway as a self-supporting institution out of the railway's earnings it would seem now to be a forlorn hope.

The Mayor said:

> If the general credit of the city, or any part of it, is to be placed behind these bonds, the amount should be reduced to somewhere near the real value of the lines purchased by us; otherwise, we will make a present of several million dollars to the company by taking some steps not required by the contract, which would enhance the value of these bonds.
>
> My position on this matter, however, is that the city is under neither a legal nor moral obligation to raise funds from any other source than the receipts of the railway to pay the principal and interest, operating and maintenance expenses; that since Stone & Webster made the contract and agreed to look to this source alone for their money, they should continue to look to it, and if the contract is not capable of performance according to its terms, modification thereof must be made by consent of the parties, or a decree of the courts, should the matter become the subject of litigation.

Mayor Caldwell stated that he had completed his investigation of the city's purchase of the lines from Stone & Webster and would be ready, when the Grand Jury met on Jan. 17, to proceed with the inquiry begun last November. The Mayor's report will not be submitted to the City Council until after the Grand Jury convenes.

Wages Advanced in Atlanta

After several weeks of negotiations a satisfactory agreement has been reached between the Georgia Railway & Power Company, Atlanta, Ga., and its employees, by which more than 1,100 men get a higher wage in 1921 than they received in 1920. This increase applies to the motormen, conductors and maintenance-of-way men, shopmen and workers in the carhouses covered by former annual contracts.

It is estimated the increase will cost the company $75,000 annually. Both sides have announced that the new arrangement is satisfactory to all concerned. The new scale of wages included in the new contract is based upon the number of months of service and is graduated as follows:

The first three months' service, 44 cents an hour.

The next nine months' service, 46 cents an hour.

After one year's service, 48 cents an hour.

This is an increase of 2 cents over the scale of 42 cents, 44 cents, and 46 cents, granted the men in the spring of 1920 by an arbitration board. The scale of 1920 was at first refused by the men, who went out on a four-day strike.

Salaries of Officers to Be Cut

Reductions of approximately 20 per cent in the salaries of all employees of the Cleveland (Ohio) Railway from the president down are expected to be announced about Feb. 1, according to intimations that have come from the executive offices of the company. This follows a 20 per cent reduction made in the wages of track laborers the first of the year, and presages a cut in the wages of the motormen and conductors when the agreement of their union with the company expires on May 1.

John J. Stanley, president of the company, has already announced that he proposes to reduce his own salary, which is $30,000 a year.

Fear of a strike on May 1 has already been expressed because union officials have indicated that they do not propose to accept any wage reduction without a struggle.

Because of the fact that the 6-cent rate of fare is not bringing in the revenue expected, due to a falling off in the number of riders, directors of the Cleveland Railway at their meeting late this month are expected to reject an ordinance passed by the City Council authorizing a half rate of fare for school children.

Wages Reduced in Rockford

Simultaneously with the order of the Public Utilities Commission of Illinois for a 1-cent increase in fare came the announcement of a reduction of approximately 10 per cent in wages of all employees of the Rockford City Traction Company and the Rockford & Interurban Railway. The cut is to be effective from Jan. 15, according to Manager W. C. Sparks.

The wage reduction, it was said at the local offices, is in line with the company's policy of retrenchment, made possible by lowering cost of living. Employees of the transportation companies have been notified of the new wage scale. It affects shop and trainmen and the office force.

The new wage scale for trainmen on the interurban lines will be from 50 to 53 cents an hour and on regular city runs (two-men cars) from 46 to 50 cents an hour. One-man car operators receive the same scale of pay as interurban trainmen.

The reduction in wages will amount to 7 cents an hour.

According to Mr. Sparks, trainmen on the interurban lines have been paid from $175 to $210 a month and city trainmen from $135 to $175 a month. The cut will reduce the wages from $10 to $12 a month.

News Notes

Inquiry Into California Commission Proposed.—Since the California State Legislature has convened at Sacramento a resolution has been introduced in the Senate authorizing a joint legislative committee to investigate complaints made against the California Railroad Commission. It was announced that a public hearing on this resolution would be held at a joint meeting of the Senate and Assembly public utilities committees on Jan. 18.

$1,191,000 in Improvement in Indiana.—Interurban lines in Indiana made plant additions and reconstructions costing approximately $1,191,000 during 1920, according to the annual report of M. D. Atwater, director of service for the Public Service Commission. The total additions and improvements in all public utilities amounted to $13,189,530 during the year. City railways spent a total of $2,527,500 during the year, mostly in Indianapolis, Kokomo and Terre Haute.

Utility Commissioners Unconfirmed.—Nominations made by Governor Edwards of New Jersey to compose a new Board of Public Utility Commissioners were not confirmed by the State Senate in special session. In a ten minute executive session, the Senate by a vote of nine to nine, refused to force the Senate judiciary committee to report the nominations to the Senate. The brief session adjourned without date. The nominations, therefore, died with the opening of the 1921 Legislature.

Council Approves Chicago Mayor's Plan.—The City Council of Chicago, Ill., voted sixty to one on Jan. 19 to approve Mayor Thompson's traction plan and submit it to the General Assembly to secure the enabling legislation. Many of the Aldermen objected to features of the plan, particularly the creation of another independent taxing body, but approved the plan because they did not apparently want to be placed in the position of opposing 5-cent fares and because it was understood that approval meant only the placing of the measure before the people for their decision. The so-called Thompson plan was reviewed at length in the ELECTRIC RAILWAY JOURNAL for Jan. 15, page 150.

Program of Meeting

Public Representatives of Urban Transit

A meeting of the Public Representatives of Urban Transit is to be held in Cleveland, Ohio, on Jan. 25. The meeting is called by W. C. Culkins, local street railway director at Cincinnati and president of the association.

Financial and Corporate

Steps Toward Reorganization

Rhode Island Companies Clearing the Way for Foreclosure and Sale Probably by April 1

In the Superior Court at Providence, R. I., on Jan. 5 steps were taken to bring about the foreclosure of the mortgages on the properties of the Pawtuxet Valley Electric Street Railway and the Cumberland Street Railway. The complainant in each case was the Central Union Trust Company, New York, representing the holders of mortgage bonds, and motions were filed by Richard B. Comstock, counsel, to consolidate the proceedings with the receivership of the Rhode Island Suburban Railway, owner of both properties subject to the mortgages.

FURTHER RECEIVERSHIPS

The court issued an order granting a hearing on the motions on Jan. 19, and at that time, if it grants the prayers of the complainants, it will appoint as receivers for the Pawtuxet Valley and Cumberland companies Benjamin A. Jackson and Harold J. Gross, receivers of the Rhode Island Suburban Railway, included in the system of the Rhode Island Company.

This completes the institution of foreclosure proceedings in the cases of all properties now operated by the Rhode Island company and opens the way to speedy transfer of the properties to the United Electric Railways when a plan of reorganization shall have been agreed upon by the security holders.

If the three protective committees representing the holders of bonds agree to accept the jitney ordinance—a measure upon which there has been insistence as an essential to the railway reorganization—and to proceed with the reorganization, copies of this plan will be sent to each set of security holders and they will have thirty days within which to accept or reject it. A little longer period will be allowed within which bondholders and stockholders who have not already deposited their securities with their protective committees may do so.

FORECLOSURE SALE BY APRIL 1

Foreclosure proceedings will then be hastened in the courts and it is expected that the properties will have been put up at public sale and bought in for the United Electric Railways before April 1.

The charter of the United Electric Railways will expire by limitation early in April if the company has not by that time taken over the traction system, or if the time limit shall not have been extended by act of the General Assembly.

The Pawtuxet Valley Electric Street Railway was incorporated July 23, 1891, with a capital of $200,000. The charter was amended March 14, 1893, and the capital increased to $400,000, of which but $247,200 in bonds have been paid in. The company conveyed all its property, rights, privileges and franchises to the Rhode Island Suburban Railway on Jan. 1, 1900, the latter company guaranteeing the bonds of the Pawtuxet Valley company both as to interest and principal.

The Cumberland Street Railway was incorporated on March 1, 1898, with a capital of $100,000, and on Jan. 1, 1900, conveyed its property to the Rhode Island Suburban Railway. There are $43,000 in outstanding bonds which are guaranteed by the Suburban company.

Another Brooklyn Route Abandoned

The operation of the so-called Park Slope line of the Brooklyn (N. Y.) City Railroad, extending from Borough Hall to Coney Island Avenue and Cortelyou Road, has been abandoned. As a result of the receivership of the Brooklyn Rapid Transit Company and later of the independent operation of the Brooklyn City Railroad, a number of routes which had been operated over the tracks of various companies were terminated in October, 1919. These suspensions inconvenienced the public in many sections of Brooklyn, and in an effort to determine whether relief could be found by the operation of cars over tracks of several companies, it was determined to establish the so-called Park Slope line, but it was specified that unless there was sufficient riding to give the companies an income which would pay for the cost of the service the route might be abandoned. The Public Service Commission approved the operation of the line on these conditions.

The operation of the line was commenced on April 12, 1920, and as the result of seven and a half months' service the gross receipts failed by $9,990 to meet the operating expenses. The commission was thereupon notified that service would be abandoned unless the commission consented to the establishment of a shorter route from Borough Hall to Park Circle. The companies expressed their willingness to operate this route for a period, provided the receipts were sufficient to pay the operating expenses.

Application was made on Dec. 22 to the Public Service Commission for permission to operate on this basis. On Jan. 11, however, the commission denied the application for approval of the proposed agreement with respect to the line from Borough Hall to Park Circle. As a result of commission's refusal the railway has ceased operation.

New Orleans Value Undetermined

Time Approaching When This Matter Must Be Settled if Fare Problem Is to Be Solved

The matter of the valuation of the railway property of the New Orleans Railway & Light Company, New Orleans, La., is one of the things that the knowing ones refuse to discuss. Meanwhile, the time is fast approaching when the question of how much the property is worth must be settled.

The company in one of its revised estimates placed the valuation at $55,000,000. On the other hand the special masters in chancery announced that they thought the property was worth $41,500,000. As none of the three masters was versed in utility valuation matters their estimate does not appear to have made a lasting impression upon the Federal Court, for the findings of the masters was not even mentioned in the court's report.

The newly elected Commissioner of Public Utilities has addressed a communication to the receiver to learn what progress, if any, he had made in the railway valuation matter, and to this the receiver has made answer that he is giving the subject due consideration.

COMPROMISE APPEARS LIKELY

The public utilities committee of the Association of Commerce has also directed inquiries to the Commissioner of Public Utilities to learn how soon a conference could be arranged between the Association of Commerce, the Commissioner of Public Utilities and the receiver of the railway. His answer was: "We are waiting on the receiver."

The consensus of opinion is that the valuation of the railway, gas and electric property when the matter is finally determined will be around $47,000,000 against the company's $55,000,000 and the masters in chancery $41,500,000.

Meanwhile, the "referendum" people, failing to secure the signature of the requisite 30 per cent of the registered voters for the repeal of the 8-cent fare, have petitioned the City Council to repeal the ordinance authorizing the increase, and have placarded the city with posters, in which it is pointed out that the real value of the property is only $27,420,410 while its paper value is represented to be $70,892,200, leaving a difference of $42,768,990, which the "referendum people" allege is "water."

One of the reasons assigned by the Commission Council, just expired, for advancing the fare from 6 cents to 8 cents was that the railway should be allowed the increase in order to permit it to meet the increased cost of material and the higher rate of taxation. Under the circumstances much surprise is expressed at the announcement made on Jan. 12 that the company had been notified by the city authorities that its property would be seized for the 1920 city taxes unless it paid its indebtedness forthwith. Its indebtedness to the city for the 1920 taxes is placed at $567,000.

Dallas Railroad $635,401 Behind

Directors Explain Deficit in Authorized Return — Credit Must Be Restored So Company Can Function Properly

The Dallas (Tex.) Railway, in response to the request of the City Commissioners, has presented to the members of that body a statement showing the condition of its property. The railway recently asked the City Commission to pass a regulatory ordinance authorizing an advance in rates from a 6-cent fare to a 7-cent fare, in the hope that the company might increase its earnings so as to establish a basis of credit on which it would be possible to meet its franchise obligations, pending the working out of a real service-at-cost franchise. The city has declined to accede to this and has laid the appeal on the table.

THE attitude of the company in its statement is that the railway must be met in a spirit of co-operation by the city's representatives if the traction problem of the city is be solved. In short, negotiations between the company and the city must be characterized by mutual understanding, where sound business and economic principles prevail, if Dallas is to be adequately served by its railway.

SOME STARTLING FINANCIAL FACTS

The statements of the company, filed monthly with the city, showing its financial status, reveal the fact that the company has earned in the thirty-eight months of operation between Oct. 1, 1917, and Dec. 1, 1919, over and above its actual operating expenses, interest charges and accident reserve, only $44.51. The accident reserve as of Dec. 1, 1920, amounted to $25,189. There were suits pending at this time amounting to $580,588, and in addition many unpaid accident claims.

The company's cash statement shows that the amount of cash in bank at the close of business Dec. 27 was $22,437, with bills payable and accrued power charges approximating $125,000. Each month the company has set aside and charged to operating expenses its estimated pro rata part of its ad valorem annual taxes, amounting to $119,754. This money has been used through the year for capital expenditures, and the account is to be reimbursed by loans which have previously been arranged for when the tax becomes payable the first part of 1921.

NOTHING FOR STOCKHOLDERS

The stockholders of the Dallas Railway have received nothing since the beginning of operations of the company on Oct. 1, 1917, and the company has earned an average rate of return of only 4.58 per cent on its property value, or just about enough to pay its interest charges.

On the matter of credit the directors said:

> It is true that the franchise requires the Dallas Railway to pave its portion of streets when ordered to do so by the city; and we, the directors, assert that the company is willing to do so whenever it is able. It can not do so without money, and it can not get money without credit. It can not have credit without adequate earnings to pay for its operations and the cost of new capital.
>
> It can readily be seen how impossible it is to expect investors to become interested in a company whose demonstrated earning power is only 4.58 per cent on the property value.

The directors then discuss the obligation of the General Electric Company toward the railway and the commitments made by C. W. Hobson. On these points they say:

> These statements are facts that can be controverted, and we believe that our fair-minded citizenship will concede that both the General Electric interests and the Dallas Railway have carried out their commitments so far as lay in their power.

On the specific point of the reason for their appeal the directors say:

> This communication is presented with the hope that immediate steps may be instituted whereby the railway problem will be approached with the desire for a solution which will be equitable both to the city and the company, and which will permit the immediate extension of the street railway facilities so badly needed.

On the matter of commitments cited as having been obtained from General Electric Company interests in case the franchise was granted to C. W. Hobson, the one calling for the greatest expenditure was the proposal for building two interurbans into Dallas of not less than 30 miles each in length. The committee says these interurban lines have not been built, for the reason that previous to the acceptance of the franchise by C. W. Hobson, the City Commission was notified that as the United States was then at war with Germany, it would be impossible to finance and build the two interurbans within the time first agreed upon. The franchise was thus accepted, with the above understanding, and the commission from time to time extended the time for beginning the construction of the interurban lines. Meanwhile, the citizens of Dallas voted to substitute the Wichita Falls interurban line for the two proposed interurbans. It was found impossible, however, to finance the Wichita Falls project, so that it is now being arranged to cause the two interurbans as first proposed to be built. The time set by the commission for starting the two interurbans is Jan. 15, 1921.

The promise was made that the Oak Cliff street railway lines, either through purchase or lease, would be placed on the same basis and have the same advantages to the citizens of Oak Cliff and to the people of Dallas generally as would pertain to the lines east of Trinity River. The directors point out that the Oak Cliff lines are now held under lease by the Dallas Railway and are operated by the management as a unified system with the lines owned by the company.

The railway has spent, to Dec. 1, 1920, $1,706,334 of new money on improvements and extensions to the property since the beginning of operations under the franchise, Oct. 1, 1917. The estimated additional amount to complete improvements in progress as of Dec. 1, 1920, is $134,637. This is more than the original commitment.

The directors point out that the promise has been kept that the Dallas Railway would be operated under a charter issued by the State of Texas and managed by local executives. The financial condition of the company and its showing as to earnings have, however, been such that the owners of the equity in the property have not been able to refinance it so as to diversify the ownership and place its notes and certificates of indebtedness, as was contemplated.

Pre-election commitments made by C. W. Hobson as to the doing of certain work by the Dallas Railway in case the franchise was granted are also gone into at length by the directors and disposition made one by one of the extent to which the promises have been fulfilled.

The disposition of the return of 4.58 per cent earned on the property value during thirty-eight months of operation, Oct. 1, 1917, to Nov. 30, 1920, is explained as follows:

Amount of return earned	$1,203,436
Disposition of return earned:	
Rent for Oak Cliff lines (three years at $115,000 a year, two months at $120,000 a year)	365,000
Interest on $1,000,000 7 per cent secured notes	134,035
Interest on $750,000 6 per cent income, notes	142,500
Interest on $2,529,868 6 per cent income notes	456,217
Interest to Electric Bond & Share Company on short-term loans	1,519
Interest to local banks on short-term loans totaling $250,000	5,413
Interest to Dallas Electric Company on money borrowed to construct addition to interurban terminal	9,416
Interest on lease notes, or car trust certificates, given in connection with the purchase of fifty new cars	4,135
Three monthly payments of $7,666, each on principal, cost of fifty new cars	23,000
Monthly payments to Dallas Electric Company on principal of 10 per cent demand notes, as per agreement	6,913
Commission and expense in connection with procuring new money	55,284
	$1,203,436

The total of bonds and notes outstanding, as of Dec. 28, 1920, was $4,892.288. A detailed explanation is included in the statement showing how these obligations are held.

Some facts taken from the company's records for the first thirty-eight months of operation, to Nov. 30, 1920, follow:

Railway earnings	$7,239,404
Railway expenses and accidents and repair reserves	6,213,984
Net from railway operation	$1,025,419
Interburban terminal net earnings and non-operating income	178,016
Available for authorized return	$1,203,436
Authorized return under franchise, 7 per cent per annum on property value, or amount invested	1,838.540
Deficit in authorized return	$635,104
Rate of return earned on property value of investment (per annum), per cent	4.58
Percentage of railway gross receipt expended on maintenance (minimum franchise requirement 10 per cent)	17.80

10,767,876 More Riders; 2,295,995 Fewer Miles

Trustees Report Better Results in Boston—No Prospect of Reducing Ten-Cent Fare—Railway Fulfilling Purpose

Pursuant to the provisions of Chapter 185 of the Special Acts of 1919 the trustees of the Boston (Mass.) Elevated Railway have submitted their second report to the Senate and the House of Representatives. The document covers the proceedings of the trustees for the year ended Dec. 1, 1920. The financial condition on Dec. 1, 1920, and the results of operation during the entire period of public control are set forth in a statement made a part of the report.

THE statement shows that for the twelve months ended Nov. 30, 1920, the cost of service exceeded receipts by $595,155, while during the twelve months ended Nov. 30, 1919 the cost of service exceeded receipts by $2,585,137.

The second year of operation under public control closed on June 30, 1920. The revenue in that year exceeded the expense of operation by $17,079. This surplus does not take into account $435,348 actually paid in October, 1919, but paid under a retroactive wage award applicable to the previous May and June. This amount would have been included in the assessment in July, 1919, against the cities and towns served by the railway had it been known in season for that assessment. Should this item properly be included in the cost of service for the year ending on June 30, 1920 there would still have been no deficit for that year under the budget system which had been adopted in accordance with a practice which was approved by the Department of Public Utilities.

Under that system the total expenditure for the year for maintenance of way, structures and equipment is estimated at the beginning of the year and charged proportionately to each month. When actual expenditures in any month exceed the allotted amount the excess is carried in reserve account to be offset by the credit arising during any other month in which less than the allotted amount is expended. At the end of the fiscal year the accounts are adjusted and show actual expenditures.

On June 30, 1920, in accordance with this procedure $418,343 had been charged to equalization and credited to operating expense. This amount coupled with the surplus of $17,079 would set off the item of $435,348 for back wages and leave a credit balance on June 30, 1920, of $75.47.

The actual cost of operation from July 1, 1920, to Dec. 1, 1920, covering the first five months of the third year of operation by the trustees exceeded receipts by $979,012. The results of operation in December will show a substantial profit. This, taken with the numerous offsetting credits to be made by adjustment in closing the book of the year, will very materially reduce previous losses. Though the exact figures showing the operating deficit on Dec. 31, 1920, are not yet available, it is estimated that it will not exceed an amount which in the judgment of the trustees can be absorbed during the next six months. In such case there will be no assessment upon tax payers next July.

Operation in 1920 faced extraordinary costs in expenses for removal of snow, advance in wages and higher prices of coal and materials. The abnormal snowfall of last winter cost more than the combined snowfalls of the preceding nine years. The direct expense attributable to removal of snow was $600,000; the indirect cost of the storms from added expense in maintenance of equipment and from loss of revenue increased this amount to approximately $1,000,000.

The wage agreement with the carmen's union expired on May 1 and in the absence of agreement as to future wages the issue was left to arbitration. The employees were awarded an increase of 16⅔ per cent. The present schedule is effective until July 1, 1921. Other agreements with craft organizations have expired and have been renewed with some advance in wages.

COMPARISON SHOWING GROWTH OF TRAVEL SINCE 1915

Year	Average Weekday	Average Saturday	Average Sunday	Average Holiday	Total for Year
1915	992,283	1,140,046	685,726	846,860	352,469,586
1916	1,050,038	1,218,749	718,804	832,962	373,577,908
1917	1,073,943	1,249,588	728,847	857,902	381,017,338
1918	985,384	1,147,809	658,902	775,634	348,664,700
1919	934,918	1,078,635	596,182	706,429	324,758,685
1920	960,737	1,072,319	591,063	703,634	335,526,561

The abnormal rise in price of coal has been most disturbing. The average cost of coal in 1919 at the power stations in Boston was $5.90 a ton; in October, 1920, the average cost had risen to $13.82 a ton; some coal has cost over $20 a ton.

The item expended for taxes, too, has been larger than that of the preceding year by about $200,000. The taxes of the coming year will undoubtedly be smaller.

The growth of travel is shown in the accompanying compilation.

Higher fares though increasing revenues cut down riding. The trustees point out, however, that no such reduction has been made in the number of persons using cars as to suggest that the railway is not fulfilling the purpose of its existence in furnishing a cheap method of transportation for the multitude of people. While between 10,000,000 and 11,000,000 more passengers were carried in 1920 than in 1919, 600,000 fewer passengers were carried on Saturdays, Sundays and holidays. The trustees say that the explanation for this is found in the fact that upon the days last named the automobile is in more general use as a substitute for the street car.

Though the arbitration award of last June advanced wages 16⅔ per cent, a rearrangement of working hours and conditions was effected which benefited all concerned and secured a large saving in labor costs. "Extra' blue uniform men were assured a full day's pay and all men are thus guaranteed an eight-hour day. Men not having schedule runs are required to be available for duty during eight-hour periods and to perform within their eight-hour periods such work as may be assigned to them.

A substantial economy has also resulted from the elimination of unprofitable mileage without impairment of service. Though 10,767,876 more passengers were carried in 1920 than in 1919 the mileage was less by 2,295,995 miles. The revenue per car-mile increased from 53.74 cents to 64.61 cents and the number of revenue passengers per car-mile from 6.066 to 6.548. An important factor contributing to the net increase in earnings was the operation of additional three-car trains and one-man cars.

The high cost of coal has in a measure been offset by economies in use of power. Coasting recorders have been introduced with good results. It is estimated that when the entire system is equipped with these instruments an economy of more than $100,000 a year will be secured.

The following tabulation shows the number of tons of coal burned in 1920 as compared with that burned in the previous year:

TONS OF COAL BURNED

	1919	1920
January	28,020	33,874
February	24,990	26,045
March	26,440	24,838
April	24,396	21,073
May	22,778	17,999
June	20,775	16,426
July	18,088	16,693
August	20,817	16,617
September	20,609	17,226
October	23,886	18,953
November	26,131	22,955
December	30,740	25,386
Totals	287,670	258,085

The number of pounds of coal consumed to generate one kilowatt in 1920 was 2.346 as compared with 2.835 in 1919.

Seventeen miles of track have been reconstructed; eighty-one one-man cars of the most approved pattern have been purchased and put in commission; 105 additional center entrance cars have been purchased and are to be delivered in the spring; sixty-five new steel cars have been bought to replace cars upon the elevated structure and are to arrive in the summer; four-car trains are now running through the rush hours in the

Cambridge Subway and Dorchester Tunnel; a new carhouse and new lobby have been constructed at Fields Corner; additional rotary converters have been bought for the equipment of substations connected with the power plant; and large preliminary expenditures have been made for the extension of yard facilities at Forest Hills and the construction of much needed repair shops in Everett.

MILEAGE RATES IMPROBABLE

The trustees say there is no prospect of any immediate reduction from 10 cents as the basic flat fare. Experiments have, however, been made with a 5-cent service without transfer on lines where the run is short and where there is little competition with the 10-cent lines.

According to the trustees some modification of the present system of flat fares with a view to a rate more nearly proportionate to the length of ride is not improbable when conditions are such as to warrant it, but it is improbable that the flat fare upon the Boston system will give way in the near future to any radical change through the substitution of mileage rates.

CAMBRIDGE SUBWAY PROCEEDS

The proceeds received from the sale of the Cambridge Subway amounted to $7,868,000. The disposition of this money was made subject in the statute to the approval of the Department of Public Utilities. The board of trustees petitioned the Department of Public Utilities for authority to spend this sum for the purposes which the trustees cite in detail, but the Department of Public Utilities after a hearing directed the application of the fund to the following purposes:

$1,500,000	for payment of Boston Elevated Railway Company bonds due March 1, 1920.
$1,581,000	for payment of West End Railway Company bonds due August 1, 1919.
375,000	for payment of West End Railway Company note due February 1, 1920.
1,581,000	for payment of West End Railway Company bonds due August 1, 1920.
1,561,245	for payment of permanent additions to West End Railway Company property.
269,754	for payment of additions and improvements to Boston Elevated Railway property.
1,000,000	appropriated for Forest Hills Terminal yard and Everett Shops.
$7,868,000	

Suggestions of legislation desired by the trustees were duly filed in the office of the Secretary of the Commonwealth and have been printed as House Document 103.

LEGISLATIVE CHANGES SUGGESTED

The trustees also recommend a change in Chapter 185 of the Special Acts of 1919 that will permit them to file their annual report on Feb. 1 so that it may give the result of operations for a full calendar year. To give such a statement it is necessary to make the proper adjustment of numerous credits and debits which it is impossible to estimate and for which figures were not available in season for filing such a report on Jan. 15.

Simplification an Object

One Company, One Mortgage and One Franchise the Aim in Pittsburgh Reorganization

Reorganization of the Pittsburgh (Pa.) Railways is in sight, according to statements of special Counsel Charles K. Robinson to the City Council during the week ended Jan. 15. Mr. Robinson also informed Council that Receivers Charles A. Fagan, S. L. Tone and W. D. George of the railway had decided to do the paving as well as track reconstruction work involved in the improvement of East Ohio Street. This work the city had expected to do as the receivers formerly had maintained they were not in a position to do it. This action will save the city approximately $94,000. Mr. Robinson credited the present receivers with a desire to coöperate with the city and public.

For the future, outlining a plan in behalf of the city, Mr. Robinson said those interested were aiming at a complete reorganization of the Pittsburgh Railways as one company, with one franchise and one mortgage. At present the railway consists of 200 separate companies, holding 500 franchises on streets, with a result that the chief engineer of the Public Service Commission, after two years' work in Pittsburgh, said the city had the most complicated traction situation in the State.

Joint action with the city of Philadelphia to obtain better traction regulation has been decided upon at Pittsburgh. A resolution which has been adopted urged action before the Public Service Commission for the purpose of "securing justice for the people of the two largest cities in the State on the important matter of street car transportation."

With Philadelphia as the complainant, a case is due to be argued in April before the Supreme Court on the right of the city to attack rentals which the Philadelphia Rapid Transit Company is paying various underlying companies. The Public Service Commission upheld the city's right to inquire into such rentals, but the State Superior Court reversed this decision and an appeal was taken to the Supreme Court.

The Pittsburgh Railways similarly includes a number of underlying companies. The rentals of these, inextricably bound up also in the payment of bond and mortgage interest, which in most cases is guaranteed as part of the rental, total about $3,250,000 annually. The city's interest in the Philadelphia case is in the principle involved.

Receivers for North Shore Road

William Paul Allen, former assistant district attorney of New York, and John G. Moran, secretary of the New York & North Shore Traction Company, were appointed receivers of the railway on Jan. 19 by Judge Chatfield sitting in the Federal Court in Brooklyn. The receivership resulted from an action in equity by the Citizens Savings & Trust Company, Cleveland, Ohio.

Financial News Notes

Service Resumed.—The Eastern Massachusetts Street Railway has resumed service on the Somerset and Swansea line as far as Swazey's Corner. A temporary permit was issued to the company pending the final decree of the court hearing which takes place in Boston. Service on this line was suspended a year ago.

I. T. S. Subsidiary Financing.—The Bloomington & Normal Railway & Light Company, Bloomington, Ill., included in the Illinois Traction System, has petitioned the Illinois Public Utility Commission for permission to issue $108,000 of preferred stock and $165,000 of bonds, of which the sum of $72,000 will be first and general mortgage bonds.

Protective Committee Formed.—Default having been made in the payment of three installments of interest on the general consolidated 5 per cent gold bonds of the Atlantic Avenue Railroad, Brooklyn, N. Y., dated April 23, 1891, and due in 1931, a protective committee of bondholders has been formed with George E. Warren, vice-president of the Columbia Trust Company, as chairman. The Atlantic Avenue Railroad is included in the system of the Brooklyn Rapid Transit Company.

Subsidiary Elects E. M. Walker President.—E. M. Walker, Terre Haute, has been named president of the Terre Haute & Western Traction Company. Frank T. O'Hair has been named vice-president and John Beasley, Terre Haute, secretary. The directors named are E. M. Walker and John Beasley, Terre Haute; F. T. O'Hair, Fred Baber and James Stewart, Paris. The company is controlled by the Terre Haute Traction & Light Company, which in turn is controlled by the Terre Haute, Indianapolis & Eastern Traction Company. Mr. Walker is local resident manager at Terre Haute.

Permission Asked to Extend Bonds.—The Fitchburg & Leominster Street Railway, Fitchburg, Mass., has petitioned the Department of Public Utilities for permission to extend for five years, from Feb. 1, 1921, maturity of $300,000 of mortgage bonds and $100,000 of first mortgage bonds of the Leominster, Shirley & Ayer Street Railway. The company also seeks to increase interest rates on these issues of securities from 4½ per cent and 5 per cent respectively to 7 per cent on both issues because of its inability to market new bonds to meet maturing issues. The Leominster, Shirley & Ayer Street Railway is a subsidiary of the Fitchburg & Leominster Street Railway.

Traffic and Transportation

Syracuse Case Heard

Session at Albany Before Commission in Ten-Cent Appeal Concerned Mostly with Valuation

Corporation Counsel E. H. Lewis, representing the city of Syracuse, cross-examined witnesses for the New York State Railways before Public Service Commissioner J. A. Kellogg on Jan. 7 on the company's application for a 10-cent fare in Syracuse. Messrs. Gannon and Michell of Syracuse appeared for the company.

Mr. Lewis examined Horace D. Campion, Philadelphia, the engineer who made the valuations for the New York State Railways, Syracuse Lines, reproduction cost, new, at present day prices, $21,012,200; average costs 1915 to 1919, $16,663,299; and pre-war costs $12,006,134, going into detail concerning the various cost figures which Mr. Campion employed, particularly in the $21,012,200 valuation. Mr. Lewis objected to certain testimony by Mr. Campion covering real estate and buildings, the valuation for which had been made by R. T. Fredericks and E. C. Cook and accepted by Mr. Campion in his valuation, but Commissioner Kellogg accepted the testimony for what it was worth and subject to later supporting testimony. Mr. Campion said many of his computations were theoretical, based on facts and experience.

ALLOWANCE FOR WORKING CAPITAL

Mr. Campion told Mr. Lewis, although the company's business was a cash one, that the company should have an allowance for working capital so that it could buy materials on favorable figures and maintain a necessary bank balance.

At the conclusion of the evidence on Jan. 7 the counsel were unable to agree on an adjourned date, Mr. Michell and Mr. Gannon urging that the hearing be continued at an early date.

J. M. Joel, the company's auditor, was questioned by Mr. Lewis about repair and other work at the Wolf Street carhouse for Syracuse suburban lines, the valuation of which, $450,000, was charged to the Syracuse lines. Mr. Joel said he could not give the company's expenses on the service-at-cost plan at Syracuse, but he promised Mr. Lewis that he would prepare such a statement. Mr. Campion also presented a tabulation showing the weekly and monthly payroll of the Syracuse Lines.

COMMISSIONER OVER-RULES CITY'S PLEA

Mr. Lewis objected to the commission's consideration of the evidence in the Syracuse 6-cent fare case, but Commissioner Kellogg over-ruled the motion. Mr. Lewis said he would want time in which to examine that record as another field was opened up and he might want to meet something contained in it.

There were also present at the hearing Walter S. Kernan, Utica, and B. E. Tilton, Utica, vice-president and general manager; Milo R. Maltbie, New York, assisting Mr. Lewis; Ray B. Smith and City Engineer Allen of Syracuse.

Commissioner Kellogg announced Jan. 18 as the next hearing day, with all the evidence to be submitted to the commission at that time.

Fares Lower in Wisconsin than Average in United States

Street car riders in Wisconsin are paying less than the average fare charge throughout the United States, according to a comparison, made by the Wisconsin Public Utilities Bureau, between statistics compiled for the nation by the American Electric Railway Association and for the State by the Railroad Commission. The association's figures further show that of the 287 cities of the United States having a population of more than 25,000 there is a distinct movement toward a basic charge of 10 cents.

TABULATION SHOWING FARES IN WISCONSIN CITIES

City	Population	Cash Fare (Cents)	Ticket Fare (Cents)	Became Effective
Appleton	19,561	5	....	2/12/19
Ashland	11,334	7	6¼	10/16/18
Beloit	21,284	5	....	....
Chippewa Falls	9,130	6	....	....
Eau Claire	20,880	6	....	8/ 1/18
*Fond du Lac	23,427	8	7	9/ 5/20
*Green Bay	31,017	10	7	1/ 1/21
Janesville	18,293	10	7 1/7	10/29/20
Kenosha	40,472	7	6¼	10/30/20
*La Crosse	30,363	7	6¼	12/8/20
Madison	38,378	6	5 5/9	11/16/18
Manitowoc	17,563	6	6	8/9/18
Marinette	13,610	7	5	8/27/20
Merrill	8,068	7	5 5/9	12/23/18
Milwaukee	457,147	7	6¼	11/2/19
*Oshkosh	33,162	8	7	9/17/20
*Sheboygan	30,955	8	7	9/11/20
Racine	58,593	7	5 5/6	12/1/20
Superior	39,624	5	....	....

* These cities, Fond du Lac, Green Bay, La Crosse, Oshkosh, Sheboygan, have a family ticket rate of fifty rides for $3.

In Wisconsin nearly all the urban population is paying a 7-cent cash fare or less. Of the 19 cities having local service, only two cities have a 10-cent cash fare and their combined population is only 49,310. They are, Green Bay and Janesville. The ticket fare in Green Bay is 7 cents; in Janesville 7 1/7 cents.

Of the cities in Wisconsin which have a combined population in excess of 1,000,000 people, three have a 5-cent cash rate, five a 6-cent rate, six are paying 7 cents, three have an 8-cent rate, and two a 10-cent rate.

A tabulation of present fare charges in various Wisconsin cities and towns is published above.

Refuses to Reduce Fort Worth Seven-Cent Fare

The Northern Texas Traction Company, which operates the local lines in Fort Worth, Texas, has declined to reduce its fares from 7 cents to 6 cents, as asked recently by the City Commission. The refusal to comply with the request was made known to the commission in a formal communication from George H. Clifford, vice-president and general manager of the company. The city had requested that the fare be reduced to 6 cents pending a hearing on what would be a fair and equitable rate of fare for the traction company.

The City Commissioners held that Mr. Clifford's communication was unsatisfactory as lacking definiteness. Mr. Clifford made the plea that the high cost of fuel oil and other articles used in operation and maintenance of the car lines, and the city communication in reply pointed out that the traction company raised fares from 6 cents to 7 cents largely on the plea that the cost of fuel oil had advanced, but that now the price of fuel oil had declined until it was below the level paid when fares were 6 cents.

Mayor W. D. Davis suggested to the commission at the time the communication from Mr. Clifford was received that the resolution prohibiting the operation of jitneys be revoked and that the operation of jitneys be encouraged as a means of forcing the traction company to reduce fares.

Railway Asks Accident Damages

Reversing the usual procedure the Municipal Railway of St. Petersburg, Fla., is bringing suit on its own account in a case growing out of a collision between an electric car and an automobile truck. The accident is alleged to have been caused by the reckless driving of the man in charge of the truck. The electric car, of the one-man type, was badly damaged. Charles R. L. Ludwig, who is in charge of the Municipal Railway, says that the city "is going to start and maintain a policy of making the other fellows pay for damage to cars when it is a clear case of being the other fellow's fault."

Outlook Brighter for Louisville Fare Increase

An ordinance has at last been introduced in the General Council of Louisville, Ky., which promises to afford the Louisville Railway financial relief. This measure, which has already been passed by the Board of Aldermen, provides for an increase in the cash fare to 7 cents for a period of two years. The railway is required to sell four tickets for 25 cents and to carry school children for half fare. Free transfers are to be continued. The company is to maintain the pavement between the tracks and for two feet beyond the outer rails in the same state of repair as that in the remainder of the street.

During the life of the agreement the railway is to limit the payment of dividends to the following: Accumulated dividends on its preferred stock; current dividends of 5 per cent per annum on preferred stock; dividends of not more than 2 per cent on its common stock. The company has so far taken no steps to curtail its service in spite of an announcement by James P. Barnes, president, that service would be cut 25 per cent on Jan. 1. However, if relief is not given shortly, the indications are that service will have to be reduced if the railway is to continue to operate.

Eight Cents in Peoria

The Peoria (Ill.) Railway on Jan. 12 raised its fare from 7 cents to 8 cents under authority of an order of the State Public Utilities Commission. Two tickets are being sold for 15 cents. Children between the ages of five and twelve years are carried for 4 cents.

When the company sought relief in the shape of a higher fare last June, to take care of the 25 per cent wage increase granted its employees, it was estimated that an average fare of 7.72 cents a passenger would be required to yield a sufficient revenue for operating expenses and fixed charges. This was on the assumption that there would be no falling off of traffic due to the proposed fare increase or other causes. It was estimated that should there be a 5 per cent decrease in number of passengers carried, an average fare of 8.05 cents a passenger would be needed.

The company therefore sought a 10-cent cash fare, with ticket fares ranging from 8⅓ cents to 7 cents. The 8-cent fare allowed by the commission means an average fare of 7.5 cents, which, according to company officials, will not entirely afford the added revenue necessary to care for operating expenses. Since last June the railway has been operating on a straight 7-cent fare.

New Rates Effective in Seattle

The increased fare on the lines of the Seattle (Wash.) Municipal Railway became effective on Sunday, Jan. 8, the new schedule of fare being: Cash fare, 10 cents; or three rides for 25 cents, making the token fare 8⅓ cents. Six tokens are sold for 50 cents, or twelve for $1. School children continue to ride for 3 cents, or two for 5 cents, with school tokens at the rate of ten for 25 cents. The 6¼-cent bronze token is no longer accepted, but purchases may be traded in for the new "silver" token. The new tokens are sold on the cars, and carmen also sell the tokens at important downtown transfer points. The city purchased 2,140,000 of the bronze tokens last July when the first increase in fare became effective, at a cost of $18,270. More than 1,400,000 had been issued at the time of the second increase.

Riders Approve Increase

An unusual occurrence took place on Jan. 7 in Lakewood, Ohio, a suburb of Cleveland, with a population of 41,732 people, when the car riders voluntarily agreed to an increase in fare to 6 cents.

Because of a separate franchise contract with the Cleveland Railway Lakewood riders, although being hauled a greater distance than Cleveland patrons, have since the middle of November been riding for 5 cents, although Cleveland car riders have been compelled to pay a 6-cent fare. City Street Railway Commissioner Fielder Sanders has given it as his opinion that the Lakewood car riders cannot be forced to pay a higher rate of fare. However, he appealed to their sense of fairness and asked that the car riders themselves vote on voluntarily paying the same rate as the Cleveland riders. This the Lakewood car users did on Jan. 7, with the result that 6,156 voted in favor of paying the 6-cent rate, while only 2,768 voted against increasing the rate of fare.

For the Cleveland rate of fare
and Present Service
TEAR OFF THIS END

. . . .

LAKEWOOD CAR RIDERS

You have better street car service than Cleveland at a less rate of fare and at less than COST. Cleveland car riders are paying YOUR EXTRA COST.

Cleveland asks you to pay your own way or receive less service. You are not asked to change your 3c. fare.

WILL YOU BE FAIR, PAY THE CLEVELAND RATE AND KEEP YOUR SERVICE?

If YES—Tear off the top of the card and hand it to the collector.
If NO—tear off the bottom.

. . . .

Against the Cleveland rate of fare
TEAR OFF THIS END

"BALLOT" USED IN LAKEWOOD POLL

In taking the vote on the cars throughout the entire day none of the riders was asked to give his name. The rider merely pulled off a stub, thereby approving or rejecting the proposed increase, and cast it into a ballot box. Now Mr. Sanders is endeavoring to have the Lakewood Council follow the expressed wishes of the car riders by formally authorizing the company to charge 6 cents in Lakewood.

300 per Cent Increase in Auto-Car Collisions

Declaring that collisions with automobiles have increased 300 per cent in the last seven years and now constitute one-half of all accidents that occurred during the year on the Pacific Electric Railway System, S. A. Bishop, general claim agent of the company, has issued an appeal to automobile drivers for greater caution in traveling over public thoroughfares. The number of fatalities reached the peak with seventeen deaths recorded for the month of November, 1920, from accidents in which the Pacific Electric was involved. In not a single instance was it shown that the company or its employees was at fault.

The company's records show that in November, 1920, there was a total of 301 accidents from interference with vehicles, as against 124 during the same month in the year 1913. In step accidents, from falling or alighting from steps, a decrease from the 1913 figures was shown, with ninety-six such accidents reported. The total number of accidents of all kinds for the month was given at 529, the greatest in any one month in the history of the company, and an increase over the 1913 figures of 102 accidents. Mr. Bishop calls attention, however, to the fact that the increase in vehicular accidents of 177 for this period is the most serious and requires earnest thought, attention and co-operation in order that it may be remedied in the interest of the community without loss of time.

Court Approves Double Fares

The Appellate Division of the Supreme Court, State of New York, has decided that the Brooklyn City Railroad has the right to charge two fares on its Flatbush Avenue line, one in the old town of Flatbush and another in the old town of Flatlands. In consequence the company began to collect such fare on Jan. 17.

The town line is at Foster Avenue, and the second fare charge applies to passengers boarding the cars of this line west of Foster Avenue and riding to points east of Foster Avenue, or vice versa.

The enforcement of the collection of this second fare is under the same conditions that prevailed when the company originally endeavored to collect such fare and ceased doing so by order of the Public Service Commission for the First District after vehement protests by car riders.

The Brooklyn City Railroad occupies a very unusual position in that its outstanding bonded debt is probably only from 10 to 15 per cent of the value of its property, and may be said to be approximately equal to the real estate owned by the company. Under these circumstances a condition which would force the average traction property into receivership because of its inability to earn the interest on its bonded debt does not apply to the Brooklyn City Railroad.

Transportation News Notes

Eight Cents in Rockford.—The Illinois Public Utilities Commission has authorized the Rockford City Traction Company, Rockford, to raise its cash fare to 8 cents. The fare has been 6 cents, with five tickets for 30 cents.

Six-Cent Fare in Effect.—The Twin City Rapid Transit Company, Minneapolis, Minn., which operates the electric railway lines in Stillwater, Minn., has raised its fare on its Stillwater lines from 5 cents to 6 cents. The new rate was approved by the Stillwater City Council.

Eight Cents in Each Zone. — The Westchester Street Railroad, White Plains, N. Y., has been authorized by the Public Service Commission for the Second District to charge an 8-cent fare in each zone except in zone 1. The company has also been granted permission to abandon a portion of its line.

Straight Nickel Fare to Continue.—The City Council of Akron, Ohio, has passed an ordinance allowing the Northern Ohio Traction & Light Company to continue to charge a straight 5-cent fare for a period of three months, pending action on the proposed service-at-cost franchise. The company was to have returned to the practice of selling six tickets for 25 cents on Jan. 1.

Eight Cents in Streator.—The Illinois Public Utilities Commisson has authorized the Illinois Light & Traction Company, Streator, to charge an 8-cent fare on its lines in Streator. The People's Traction Company, Galesburg, has been ordered by the commission to continue its present rate schedule between Galesburg and Abington. The company had applied for an increase in the interurban rate.

Return to Old System of Fare Collection.—The Trenton & Mercer County Traction Corporation, Trenton, N. J., has returned to the old system of collecting fares. Rankin Johnson, president of the company, says that the fare boxes have not facilitated the work of the conductors to the extent anticipated and that the old system of having patrons pay the conductors will probably result in the more rapid handling of crowds.

Ten Cents in Kewanee.—The Illinois Public Utilities Commission has authorized the Galesburg & Kewanee Electric Railway, Kewanee, to charge a 10-cent cash fare on its Kewanee city lines. The company is to sell three tickets for 25 cents. The fare has been 8 cents with five tickets for 35 cents. The commission has authorized the Galesburg Railway, Lighting & Power Company to continue a 10-cent cash fare and to sell three tickets for 25 cents.

Ten Cents in Green Bay.—The Wisconsin Railroad Commission has authorized the Wisconsin Public Service Company to charge a 10-cent fare on its lines in Green Bay. Tickets will be sold in strips of five for 35 cents, with commutation tickets good for fifty rides for $3. This is not a final order of the commission but will be in effect until a study of the results obtained under these rates can be made by the commission.

Would Charge 10 Cents.—Application has been made to the State Board of Public Utility Commissioners by the Bridgeton & Millville Traction Company, Bridgeton, N. J., for permission to raise its fare to 10 cents and to abandon parts of its line. The lines on which the company seeks to discontinue service are between Newport and Port Norris and Bivalve, the Church Street and Irving Avenue line in Bridgeton and the Tumbling Dam Park. The present fare is 7 cents.

Will Vote on One-Man Cars.—The taxpayers of Saskatoon (Sask.) will vote at the 1921 municipal elections on a proposal to adopt one-man cars on the city-owned electric railway system. The City Council was recently compelled to raise the fares to 10 cents, but a downward revision is promised if one-man cars are permitted. The Brandon (Man.) Municipal Railway has raised its cash fare 2 cents above the old 5-cent rate. Limited tickets are sold at 5 cents and unlimited tickets at 6 cents.

Dime Fare Denied.—The City Commission of Owensboro, Ky., has denied an application of the Owensboro City Railroad for an increase in fare from 7 cents to 10 cents. The commission took the stand that to increase the fare at this time would reduce the number of car riders materially. The company has announced that it will discontinue service to Hickman Park, one of the principal parks of the city, and that it will introduce other economies. The fare was raised from 5 cents to 7 cents about a year ago.

Trolley Rights Not Exclusive.—Holding that the citizens of the State have the right to use of the streets either with their individual conveyances or collectively in conveyances hired by them so long as they do not interfere with the rights of others, Merrit Lane, counsel for the jitney owners in their fight with the Public Service Railway, has filed his brief in the Court of Chancery. Mr. Lane argued that the public was not bound to use railways as a means of conevyance and that the jitneys had as much right to the streets as trolley cars.

Mayor Demands Fare Reduction.—Benjamin Bosse, Mayor of Evansville, Ind., in his annual message to the City Council of that city, has suggested that the Indiana Public Service Commission be requested to reduce the fares in Evansville to 5 cents. The city lines are operated by the Evansville Public Service Company, which also operates from Evansville to Patoka, Ind. The company now charges 6 cents for city fares, but a patron is permitted to purchase twenty tickets for $1. The Indiana Public Service Commission is expected to pass upon the matter in the near future.

Ticket Counterfeiting Plot Unearthed.—In the Quincy Division of the Eastern Massachusetts Street Railway a counterfeiting plot of such proportion has been unearthed that it has become necessary to call in and exchange the blue form tickets heretofore used under which twelve rides were sold for $1. A new form of ticket was put on sale for several days at the same rate in the rooms of the Chamber of Commerce and such blue tickets as were "real" were exchanged. Officials of the railway company have offered a reward of $1,000 for the apprehension of the counterfeiters and also $250 for information leading to the arrest and conviction of any one selling the counterfeit tickets.

City Prepares for Fare Appeal.—The City Commission of San Antonio, Tex., has voted to retain Robert J. McMillan as special attorney to prosecute the city's suit against the San Antonio Public Service Company, which operates the local railway system, to compel the company to reduce fares. The case is now pending before the United States Supreme Court on an appeal. The case originated when the company, under authority granted by the Federal Court after a hearing before a special master in chancery who held the former rates were in effect confiscatory, raised its fares from 5 cents to 8 cents. The higher fare was made effective in an arbitrary order by the company when negotiations with the city failed.

Merchants Favor Worcester Increase.—Clark V. Wood, president of the Worcester (Mass.) Consolidated Railway, has notified the city authorities that the company must secure additional revenue if it is to continue to furnish service of the present quality. Mr. Wood states that the 7-cent fare now in effect has proved inadequate and that it will be necessary to raise the rate to 10 cents on the city lines and to 7 cents on the suburban zones. Mr. Wood's plan has been indorsed by the local Chamber of Commerce. Mr. Wood recently stated that for the eleven months ended Dec. 1 the increased revenue under the 7-cent fare was $384,389, while operating expense for the same period showed $569,387, and the road had a surplus of but $2,861 at the end of the eleven months' period. This is only the difference between revenue received and operating expense, not providing for payment of taxes and interest. He gave as an estimate figures for operating expense for the year 1921, based on the 1920 figures, and providing for increased taxes and the wage increase, as $5,087,290. Citing the estimated revenue of 1920 at $2,365,540, he maintained the road must have increased revenue sufficient to make up the estimated deficit for 1921 of approximately $721,000.

Personal Mention

Mr. Crecelius in New Work

Superintendent of Power at Cleveland Goes Into Consulting Engineering and Construction for Himself

Lawrence P. Crecelius has resigned as superintendent of power of the Cleveland (Ohio) Railway and will be head of a new engineering firm to engage in consulting engineering, construction and operation of properties.

Mr. Crecelius has been with the Cleveland Railway as power superintendent since 1910. Previous to that he held the same position for two years under the receivers who operated the Cleveland traction lines. From 1900 to 1906 he was electrical engineer for the United Railways, St. Louis, and for a year following that was associated with the Public Service Corporation of New Jersey. He has become well known to engineers throughout the country for his original work in the design of electrical equipment, in particular 60-cycle rotary converters. He holds a large number of patents covering types of rail bonds and methods of bonding, and has done much original work in the design of boiler settings and the operation of boiler plants.

L. P. CRECELIUS

Mr. Crecelius was one of the first to recognize the desirability of the purchase of coal upon a heat value basis with deductions for excessive amounts of sulphur and ash. The Cleveland Railway's coal contract, which was drawn up by him, has been copied by many other companies through the country. Another innovation in Cleveland during his tenure of office was the extensive use of the reinforced concrete trolley pole designed by Mr. Crecelius and copied in hundreds of different towns and cities. Mr. Crecelius was among the first to make a careful study of the question of electrolysis mitigation, including thorough potential surveys. As a result of his activity the damage to underground structures due to electrolytic corrosion has been much mitigated in Cleveland.

Within the last year the attention of engineers and railway operators has been directed to the new automatic substation of the Cleveland Railway. This is the largest automatic substation so far put into commission and it represents a long step forward in the status of this art. The development of this substation has been carried forward under Mr. Crecelius' direction. Since 1912 the Cleveland Railway has installed altogether six new substations. The design of these substations and the equipment used in them have been discussed from time to time in the ELECTRIC RAILWAY JOURNAL.

Mr. Crecelius is a past-president of the American Electric Railway Engineering Association and has for many years been very active on the committees of this association of the American Institute of Electrical Engineers, and of other engineering organizations and societies. His papers and articles have frequently appeared in engineering society transactions and in the technical press.

Until about April 1 Mr. Crecelius' address will be the Leader-News Building, Cleveland. After that date his offices will be located in the new Hanna Building, Cleveland.

S. S. Vandenburgh, Safety Manager

Spencer S. Vandenburgh has been appointed manager of the newly created Safety Council of Louisville, Ky. Mr. Vandenburgh is an electric railway man of many years' experience. Prior to his appointment at Louisville he was assistant engineer in charge of office and field engineering of the Schenectady (N. Y.) Railway. He was born in Schenectady in 1884. He received his early education in the public schools of that city, later completing a scientific course at the Union Classical Institute, and studied at Union College. During his vacations he was employed at various times in machine shops and on the erecting floor of the American Locomotive Company at Schenectady, later entering the drafting department of the General Electric Company.

In 1903 Mr. Vandenburgh joined the Schenectady Railway in connection with the construction of the twenty-two-mile interurban line between Schenectady and Saratoga Springs. Two years later he entered the employ of the New York Central Railroad on grade crossing elimination work, and other branches of field and office engineering. In 1906 he returned to the Schenectady Railway.

Mr. Butler in Atlanta

Manager Winnipeg Electric Railway Made Manager of Railways Georgia Railway & Power Company

Frank L. Butler, manager of the Winnipeg (Man.) Electric Railway, has tendered his resignation to accept a position as manager of the railway department of the Georgia Railway & Power Company, Atlanta, Ga. Mr. Butler will take over the duties until recently performed by W. H. Glenn. Mr. Glenn resigned as vice-president of the Atlanta system on Dec. 1 last to become president of the Shippers Compress Company. Mr. Butler will assume his duties in Atlanta about Feb. 1.

In his new position Mr. Butler will have charge of the operation of one of the most extensive railway properties in the South. The Georgia Railway & Power Company owns and controls more than 230 miles of track and serves Atlanta and nearby cities.

Mr. Butler returns to the United States after an absence of three years, during which time he served with the Winnipeg Electric Railway, first as general superintendent, and more recently as manager. He was born in Terre Haute, Ind., in 1874. At the age of twenty years he entered the employ of the Vandalia Railroad, now a part of the Pennsylvania system. He was employed in various capacities in several towns along the line of the Vandalia Railroad until February, 1909. He then resigned to become superintendent of the Denver & Intermountain Railway, Denver, Col. He subsequently became vice-president of the company.

F. L. BUTLER

Mr. Butler resigned on Sept. 1, 1911, to accept the position of general manager of the Alton, Jacksonville & Peoria Railroad, then under construction. Shortly thereafter he was appointed receiver of the company and later completed the line as far as Jerseyville, Ill. In July, 1913, he became general manager of the Chicago & West Towns Railway and of the Suburban Railway, with headquarters in Chicago, and remained in charge of those properties until April 1, 1918. He then resigned to join the Winnipeg Electric Railway.

M. B. Stewart has taken a position as assistant to S. L. Duckett, chief construction engineer of the Southern Public Utilities Company, Charlotte, N. C. Mr. Stewart is a graduate of Berry Industrial School and Berea College. He was connected with the construction department of the Eastman Corporation, at Kingsport, Tenn., before joining the Southern Public Utilities Company a short time ago.

P. B. Sawyer has been elected president of the Lehigh Valley Transit Company, Allentown, Pa., to succeed Harrison R. Fehr. Mr. Sawyer has been a vice-president and director of the Lehigh Valley Transit Company and its subsidiaries for the past three years. He is a vice-president of the Lehigh Power Securities Corporation, which controls the Lehigh Valley Transit Company. He will continue to reside in New York.

Joseph Russell, superintendent of railways of the Eastern Texas Traction Company, Beaumont, Texas, has resigned to become electrical engineer for the Gulf Refining Company with headquarters in Houston. He has been succeeded at Beaumont by W. A. Robertson. Mr. Robertson has for some time been in the employ of the Houston Electric Company and has served as superintendent of transportation of the Galveston-Houston Electric Railway's interurban line.

E. C. Ryder, president of the Bangor Railway & Electric Company, Bangor, Me., for the past five years, has resigned and will devote his time to the practice of law. Mr. Ryder is a well-known Maine attorney. He has been general counsel in that State for the Canadian Pacific Railway and the Eastern Trust & Banking Company. He has been closely associated with the growth and development of the Bangor Railway & Electric Company and its subsidiaries for many years. Mr. Ryder was born in Readfield, Me., in 1854. He attended Colby University and was admitted to the practice of law in 1882. He has lived in Bangor since 1894. Mr. Ryder has served in the State Legislature and as solicitor for the city of Bangor for two terms.

Thomas K. Bell has been appointed Civil Inventory Chief, U. S. Navy, with offices in the Bureau of Supplies and Accounts, Navy Department, Washington, D. C. Mr. Bell is now making a survey of the system of inventory used by the General Electric Company, with a view to its development for use by the Navy. From December, 1919, to January of the present year Mr. Bell served as appraiser for the Fourth Naval District. He was formerly general manager of the St. Petersburg Light & Power Company and the St. Petersburg & Gulf Railway, St. Petersburg, Fla. Prior to that time he was for many years engineer of William Wharton, Jr., & Company, Inc., Philadelphia, Pa., and was connected with the Interstate Railways, Philadelphia, and the Philadelphia Rapid Transit Company.

H. C. Stevenson Advanced

Will Represent President McCarter of the Public Service Railway in Southern New Jersey

Harry C. Stevenson has been appointed assistant to the president of the Public Service Railway of New Jersey. Mr. Stevenson will act as the personal representative of President Thomas N. McCarter in the Southern Division of the company's property. He will serve in a similar capacity with the Public Service Gas Company and the Public Service Electric Company. He will make his headquarters at the railway's offices in Camden.

Mr. Stevenson has been connected with the Public Service Corporation of New Jersey ever since its organization in 1903. He began his career in the public utility field in 1897, when he became secretary to the late Thomas C. Barr, then president of the Worcester Traction Company. Later he served as auditor of the Elizabeth, Plainfield & Central Jersey Railway, which was finally absorbed by the Public Service.

H. C. STEVENSON

After serving in a secretarial capacity under several executive officers. Mr. Stevenson, in June, 1907, was made assistant secretary of the Public Service Corporation and of its underlying companies. In April, 1917, he was made assistant to Vice-President Edmund W. Wakelee of the railway.

Obituary

William H. Sayre, president of the American Abrasive Metals Company, died suddenly at his home in Glen Ridge, N. J., on Jan. 6, from a severe heart attack. Before engaging in manufacturing Mr. Sayre was connected with the construction of railroads and at one time was associated with the late John B. McDonald, who had the contract for the construction of the original subway in New York. Later Mr. Sayre was elected president of the International Contracting Company, which executed many important dredging contracts. He subsequently organized and became president of the American Abrasive Metals Company.

B. A. Buckheister, superintendent of railways of the South Carolina Light, Power & Railways Company, Spartanburg, S. C., was shot and almost instantly killed on the evening of Dec. 17 by George W. Putnam, a former employee of the railway. Mr. Buckheister, in a dying condition, was rushed to the Spartanburg Hospital in an ambulance, but expired on the way. Mr. Buckheister was one of the best known men in Spartanburg. He was a native of Charleston, S. C. He went to Spartanburg about twenty-five years ago, and with the late F. W. McEowen had a large part in the building of the railway system in that city. He had been superintendent of the lines since the beginning of operations. Mr. Buckheister was fifty years of age.

Alexander J. Hemphill, chairman of the board of directors of the Guaranty Trust Company, New York City, and a director of a number of utility companies, died at his home in New York recently. Mr. Hemphill was recognized in business and banking circles as one of the foremost financiers in the United States. He had been associated with the Guaranty Trust Company for more than fifteen years, first as vice-president, later as president, and finally as chairman of the board. He was a director of the Hudson & Manhattan Railroad, the Interborough Rapid Transit Company, the Interborough Consolidated Corporation, the United Gas & Electric Corporation, the United Railways Investment Company, the Electric Bond & Share Company, the California Railway & Power Company and of other corporations.

William A. Anderson, secretary to Job E. Hedges, receiver of the New York Railways and secretary to H. H. Vreeland, director of welfare of the Interborough Rapid Transit Company, New York, N. Y., died recently following an operation for appendicitis. Mr. Anderson was born in Toronto, Ont., in 1876. He entered the service of the old Metropolitan Street Railway eighteen years ago as a stenographer in the legal department. Two years later he became secretary to Mr. Vreeland, then president of the company, remaining in this position until the receivership in 1907, when he became secretary for the receivers, Messrs. Douglas Robinson and Adrian H. Joline. When the lines were sold under foreclosure in 1912 and reorganized as the New York Railways Mr. Anderson again became secretary to Mr. Vreeland as director of welfare of the Interborough Rapid Transit Company and the New York Railways. When Mr. Hedges was appointed receiver of the latter company, in March, 1919, in addition to acting as secretary of the department of welfare Mr. Anderson also was appointed secretary for the receiver.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Light Market for Signal Apparatus

Manufacturers Differ on Effect of Safety Cars on Demand—Prices Steady with Good Deliveries

Despite the recent statement of a representative manufacturer of railway signals that his volume of sales for 1920 exceeded every other year since 1911 a survey of the field does not reveal similar conditions. The producer in question attributed his good sales in part to the development of the safety car within the past year or two, and the realization of operating men that the handling of such cars should be made as nearly automatic as possible, especially where one-man cars are operated on single track or with shortened headway.

Other manufacturers, however, do not state that the growth of safety car operation has favorably affected the signal business. In fact several representative producers state that the year 1920 was considerably below the average for installations of signal apparatus, both on steam and electric railways. This is said to be a result of money stringency and the comparatively small mileage of new track laid. Just now the market for signals remains quiet. Whether the present year will result in good sales or not is rather uncertain. Manufacturers are hoping but not expressing overly much confidence as yet. Prospects for electric railway buying are rather indefinite, but a good volume of orders may develop from steam roads.

Manufacturers are in excellent shape to make prompt deliveries. In a few instances at least, standard equipments are being made on a moderate scale for stock. Prices of signal apparatus have undergone no change and there seems to be little prospect of any material change in price at present. Raw material is plentiful but the cost of malleable castings and of cast-iron remains comparatively high; labor is high and the benefits of mass production are not easily obtained in this field.

Good Demand for Gear Cases

Orders for gear cases were good the past year and electric railways have endeavored to anticipate their needs for the present winter so far as their buying power permits. Stocks have remained low following the extra large number of replacements that were necessary last year. Another factor inducing depleted stocks has been the shortage of sheet steel and malleable iron that prevailed for many months. Sheet steel is now plentiful but manufacturers are avoiding stocking it on a declining market. The malleable iron supply while better is still not normal. Prices on malleable cases have remained steady following advances made early in the year owing to increased raw material costs but sheet steel gear case prices have shown a slight break. Deliveries of malleable cases the end of the year were quoted at forty-five to ninety days and sheet iron gear cases at thirty to seventy-five days, with no stocks in sight.

Purchasing of Lightning Arresters Only Fair

Relatively Short Deliveries Can Be Made on Car Types—No Change in Price Reported

Demand for railway type lightning arresters was only fair throughout the year and as a result good deliveries prevailed. Expectations that stocks of lightning arresters which had accumulated previous to the spring demand would be quickly wiped out did not materialize. An important factor in this is thought to be the financial situation in which many of the lines found themselves. It is known that traction companies were more willing to take a chance on not providing protection for cars, especially the smaller safety type in large use. Deliveries in general throughout the buying season varied from stock up to six weeks' time.

Present demand is only spasmodic, although scattered orders are being placed. The buying certainly is not up to normal. There are, however, many attractive inquiries and propositions before the manufacturers and these should come to a head before the spring season.

On the more popular types of car arresters shipments can be made from stock, in small quantities, up to about three weeks, depending on the manufacturer. No changes in price have been reported.

Large Power Stations at Durban

Among the most important government construction work in British South Africa to be undertaken during the next year or two, the United States consul at Durban reports, are the equipping the main line of railroad from Durban to Pietermaritzburg and the building of large power stations along the way, particularly the initial one at Durban. Besides the work mentioned above, the city of Durban has under consideration the construction of a new and much larger power plant.

Easier Supply of Paint Materials Available

Prices in General Have Shown Heavy Decreases—Return of Market Expected to Start Upward Trend

Although electric railways were not especially heavy buyers of paint, enamel and varnish, the market for these materials on the whole remained undersupplied throughout the greater part of last year. The story is one of curtailed supplies of raw material and rising costs due to such factors as the coastwise shipping strike that sent the price of turpentine at New York as high as $2.50 per gallon on April 10. Hence stocks of the finished products remained badly broken, with irregular shipments.

In the last quarter of the year, however, general demand for paint slackened materially, transportation tie-ups eased and the four months' volume of back orders existing in many cases began to be reduced. From that time on deliveries improved, with supplies now available from stock in some cases. Prices have recently been on the down grade, too, under the influence of lowered costs of turpentine and also of linseed oil.

Turpentine is quoted now at 75 cents a gallon, although a couple cents under this price has been taken for some sales. Spot stocks are reported to be not large and it is expected that a good buying movement would soon result in much higher prices. Better buying is looked for soon. White lead in oil in 100-lb. kegs is down to 13 cents a pound in a quiet market. Linseed oil too is holding on a relatively low level, 77 cents a gallon in car-load lots being quoted.

Price reductions on paints of a week or so ago were short lived, and even then there was little activity in the market. Better business is felt to be in prospect in the near future, according to representative paint producers. Higher prices also are looked for in the dry colors, some slight advances already having taken place.

Buying of Car Wheels Has Been Up to Standard

Orders for chilled iron and rolled steel car wheels on the part of electric railways the past year, while not extra heavy, were about up to the standard of other seasons. A distinct tendency is noted, however, to make wheels serve a longer period without making replacements.

Car shortages, which have delayed supplies of fuel and raw material, served to pile up unfilled orders at the factories as long as sixty days, while deliveries in some cases ranged at times as long as three months. The shortage of scrap iron wheels holding over from the war period also served to curtail the supply of chilled iron wheels. These factors were minimized by the wide distribution of wheel factories over the country, however, and by the policy of producers of maintaining reserve stocks for regular customers. As production conditions improved along with freer transportation and better supplies of material orders for wheels were filled in good time. Demand for the most part, of course, was renewal in character.

Steam railway buying, along with that of the traction companies, is such that present mill capacity is going in good shape, and is being added to in certain instances. Especially on the part of steam roads forward bookings are quite heavy. Orders last fall for new rolling stock have provided winter and spring business so that quick requirements on the part of traction companies might only with difficulty be filled.

Insulation Prices Drop

Treated and Untreated Fabrics and Compounds Off About 25 Per Cent

With the general decline in cotton and silk fabrics, there has just been a drop in price of at least one brand of finished insulations, treated and untreated, and in compounds and varnishes averaging about 25 per cent.

Buying of insulating materials is running along on a level only sufficient to keep up with the demand at present existing in the apparatus field. This is quite light as evidenced by the reduction in orders placed with manufacturers of electrical equipment.

Orders for Repair Seatings Rather than Seats

Manufacturers of car seats report a rather light demand for finished seats from electric traction companies in the year just past, but buying of seating material for repairs was fairly good. Many car builders now make their own seats, and this of course affects the demand there somewhat. Steel was very difficult to obtain and seats with steel underframes consequently were slow in delivery, especially those employing plush, leather or imitation leather. These materials were all very scarce.

Rattan, however, remained in fairly good supply, in some cases fair-sized stocks of repair material being maintained, while in others deliveries ranged as long as six weeks during the summer. The latter delay was partly due to a scarcity of ship bottoms with which to transport rattan from the Far East.

At the same time high freight rates prevailed and the cost of native eastern labor has been on the increase. Manufacturing facilities are now good and an adequate supply of car seats and seating material is expected to be available to meet the good demand that seems to be anticipated in the spring.

Armature Coil Market Quiet

Some Companies Have Dropped Price 5 to 10 per Cent in the Last Two Months

Activity in the market for armature and field coils represents only the buying for present needs. To date the winter has been pretty free from snow and this has had a big effect on orders for this equipment for maintenance. At this time a year ago the market was quite reversed and deliveries were longer than at present.

Safety-car equipments are becoming rather standardized and some coil manufacturers have wound for stock to take care of rush orders should heavy storms cause burnouts. On the other hand, from other quarters up to four weeks is required to fill orders for safety cars. For coils to fit the larger types of railway motors from four to eight weeks is the quotation for shipments.

Following cotton and copper prices down at a respectful distance December saw about a 10 per cent reduction in price of these coils in some instances, while in other instances no reductions were made until the middle of January, when a 5 per cent cut was made. From still other directions no change is reported.

General Electric Finds Cut in Force Necessary

With a payroll reported to be the highest in its history, and with bookings of new business at a rate of about $200,000,000 at this time, while early in 1920 they were at the rate of about $350,000,000, it is not surprising to learn that the General Electric Company finds it expedient to make reductions of about 10 per cent in the working force in the factory departments of its various apparatus and supply plants. At the same time there is a sufficient volume of back orders to keep the plants working for several months.

Rolling Stock

The Cleveland (Ohio) Railway, it is reported, will purchase fifty new motor cars and fifty new trailers at a cost of $930,000 if the Council permits the amendment to the company's franchise allowing it to dispose of new stock at less than par.

Franchises

Indiana Service Corporation, Fort Wayne, Ind.—An extension of the city lines of the Indiana Service Corporation of Fort Wayne, Ind., will be made in the Bloomingdale section of the city this coming summer, following the recent approval by the Fort Wayne board of public works of a franchise, giving the corporation the right to lay new tracks on various streets in that city. The franchise calls for the establishment of a line from the present terminus of the Huffman Street line down Franklin Street to Third Street and out Third Street to Runion Avenue. Robert M. Feustel, president of the corporation, expects to begin work on the new tracks within a comparatively short time.

Track and Roadway

Calgary, Alta.—Request for extension of the white car line route in East Calgary from the end of the present line to make a loop round by Twenty-second Street and Seventeenth Avenue will be revived by the East Calgary Ratepayers' Association.

Louisville (Ky.) Railway. — The Louisville Railway plans to take up and relay the curved track at Third and Liberty Streets, Louisville. The work of rearranging the track and shortening the curve will be expedited as far as possible because of traffic congestion and the possibility of accidents resulting from the torn-up condition of pavement.

Louisville (Ky.) Railway.—The Market Street Merchants' Association has placed before the Louisville Railway an offer to build two car tracks a distance of two blocks to connect Third and Jefferson Streets with Third and Main Streets if the railway will route the Indiana interurban cars through Third Street and down Main instead of west on Green Street. No action has been taken on the matter so far.

New York, Westchester & Boston Railway, New York, N. Y.—It is expected that the New York, Westchester & Boston Railway will extend its electric line to Port Chester. This is a step in the project to connect New Rochelle and Larchmont. The route for this line runs parallel to the New York, New Haven & Hartford system and so far the plans include a double-tracking to Larchmont.

Dallas-Terrell Interurban Railway, Terrell, Tex.—Citizens of Terrell, Tex., have taken action looking to insuring the building of the proposed Dallas-Terrell interurban line, which has been considered as one of the lines to be built by the Dallas Railway under its commitments to the city of Dallas. A committee of Terrell citizens has been appointed to secure right-of-way for the line from Forney to Terrell, a distance of about fifteen miles. Citizens of Forney will guarantee right-of-way from Forney to the Dallas County line.

Dallas (Tex.) Southwestern Traction Company.—E. P. Turner, president of the Dallas Southwestern interurban, organized to build from Dallas to Irving, thence to Cleburne and Glenrose, has requested an extension of time from the City Commission of Dallas for building the line. Mr. Turner explained to the commission that he had been unable to complete financial details, and that he had found it impossible to complete the line within the time set. Eight miles of the line have been graded, but no other work has been done. The extension of time has been granted.

Houston (Tex.) Electric Company.—The Houston Electric Company will agree to remove its tracks from Main Street and lay new double track line on Fannin Street, one block removed, if the public desires such a change, Luke C. Bradley, district manager for Stone & Webster, has told the Houston City Council. Mr. Bradley asked, however, that the tracks be left on Main Street for the time being and that the Fannin Street route be tried as an experiment until the general public had decided if they preferred Fannin Street to Main Street. Mr. Bradley's proposition was accepted by the City Council. The removal of the tracks to Fannin Street will cost about $200,000.

Peterborough, Ont.—The construction of a suburban car line on Monaghan Road is being urged on the Utilities Commission.

Hydro-Electric Power Commission, Ont., Canada.—A by-law to turn over to the Hydro-Electric Power Commission of Ontario the management and operation of the local street railway in Guelph for a term of fifty years was carried by ratepayers.

Power Houses, Shops and Buildings

United Railways Company, St. Louis, Mo.—Special Master Lamm in the receivership of the United Railways of St. Louis has announced that he will recommend to the United States District Court that Receiver Rolla Wells of the railway company be authorized to spend approximately $325,000 for the installation of five automatic substations for the distribution of power.

Interstate Public Service Company, Indianapolis, Ind.—The Interstate Public Service Company has notified the Public Service Commission of Indiana that within thirty days the company will begin service over a new high tension, single-phase electric power line from a plant at Monticello toward Logansport. The company will serve Idaville and Burnettsville, in White County, with electric power. This line will be a three-phase eventually.

Interstate Public Service Company, Indianapolis, Ind.—Announcement has been made by officials of the Interstate Public Service Company that in a short time a part of the electric current used on transmission lines in southern and central Indiana will be supplied by the water-power generating station at Keokuk, Iowa. The Interstate Company operates three transmission lines out of Seymour, Ind. One extends to Indianapolis, another to Louisville, and a third to the company's water power station at Williams, in Lawrence County. Before the transmission lines were constructed the company maintained a generating plant in each city.

Salt Lake & Utah Railroad, Salt Lake City, Utah.—The Salt Lake & Utah railroad has ordered from the Westinghouse Electric & Manufacturing Company equipment for a 500-kw. automatic substation. The converting equipment consists of an induction motor driving a 500-kw. 1,500-volt direct-current generator.

Trade Notes

The Yale & Towne Manufacturing Company, Stamford, Conn., has made arrangements for increasing the manufacturing facilities of its chain block and electric hoist works at Stamford.

E. A. Palmer has been appointed manager of the railway division of the San Francisco office of the Westinghouse Electric & Manufacturing Company.

H. M. Byllesby & Company, 208 South La Salle Street, Chicago, investment bankers, engineers and managers, are distributing a new booklet describing the scope and services of the organization.

Vinton Smith, who has been connected for several years with the San Francisco office staff of the Standard Underground Cable Company, has been appointed assistant Pacific Coast manager, reporting to Richard G. Harris.

The Allen-Bradley Company, 284 Greenfield Avenue, Milwaukee, Wis., has increased its authorized capitalization from $186,000 to $250,000 to provide for expansion to its business. The company manufactures electric control devices.

The Cutler-Hammer Manufacturing Company, Milwaukee, Wis., announces the opening of a St. Louis office in the Railway Exchange Building, in charge of Harold Phillips, formerly of the engineering department of Chicago and later office manager of the Chicago office. This new office is a branch of the Chicago district office.

The James T. Hessel Company, New Haven, Conn., has been appointed distributor for the State of Connecticut for the "National" renewable fuse. This recently established organization, with headquarters at 19 Prout Street, New Haven, has just enlarged its warehouse to accommodate a complete stock of pole-line hardware, crossarms, etc.

National Railway Appliance Company, 50 East Fourty-second Street, New York City, with branch offices in Boston and Washington, and the Hegeman-Castle Corporation, Chicago, Ill., announce that the selling agency for the Clapp Fire Resisting Paint Company, Bridgeport, Conn., has been discontinued as of Jan. 14.

The Great Western Contracting Company, Kansas City, Mo., representatives for the Conveyors Corporation of America, Chicago, has changed the name of its organization to the Rawlings Industrial Equipment Company. This organization is sales engineer for the manufacturers of power plant machinery. The Rawlings Industrial Equipment Company, besides handling coal and ash conveyors, is also representative of the Springfield Boiler Company and the Cooling Tower Company.

The Foreign Trade Supply Corporation has been organized with its main office at 17 Battery Place, New York City, of which E. C. Morse, former director of sales, War Department, is president, A. LaMar, former assistant director of sales, War Department, is vice-president and Paul Klopstock is chairman of the board of directors. The corporation will engage in a general merchandise brokerage exporting and importing business and in the buying and selling of foreign securities.

International G. E. Moves Headquarters.—The headquarters force of the International General Electric Company, Inc., which has been housed in the main office building of the General Electric Company, has just moved into its new office building erected on what was formerly the Westinghouse property on River Road, Schenectady, N. Y. This change places under one roof about 400 persons in the following departments: Executive, European, the Americas, Far East, merchandising, service and accounting. The building is six stories high with a basement under half of it. The total floor space is approximately 70,000 sq.ft., each floor being about 60 ft. x 220 ft.

Robert E. Horton, Harry Barker, and **Robert C. Wheeler** have become associated under the firm name of Horton, Barker & Wheeler, to continue their consulting engineering practices formerly carried on under the names of Robert E. Horton, consulting hydraulic engineer, Albany, N. Y., and Harry Barker and Robert C. Wheeler, engineers, New York City. The new company will have its headquarters in Albany, N. Y., with offices in New York, Harrisburg, Pa., and an engineering laboratory at Voorheesville, N. Y. It will specialize in power development and transmission, water supply, sewerage and sewage disposal, public utility rates and valuation.

New Advertising Literature

Industrial Locomotives.—Bulletin No. 44251 of the General Electric Company is on locomotives for "Industrial Haulage."

Car Seats.—Supplement to the reversible-seat bulletin No. 246 gives "Improvements in Brill Winner Seats," published by The J. G. Brill Company, Philadelphia, Pa.

Heavy Oil Engines.—The Dodge Sales & Engineering Company, Mishawaka, Ind., has published a small catalog describing its heavy oil stationary engines, heavy oil marine engines and heavy oil engine-driven electric generating units.

National Brake Company

If you were a shoemaker and undertook to put a number 7 shoe on a number 9 foot, you would have trouble in making the wearer believe it was a good fit. You might do it and "get away with it" once but it would be a misfit, just the same, through no fault of the shoe.

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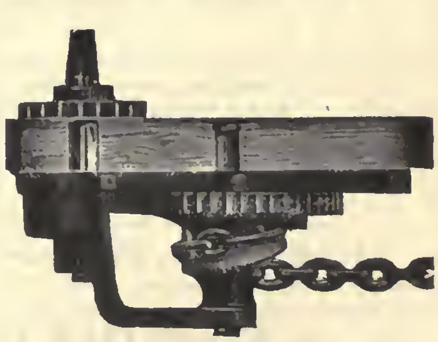

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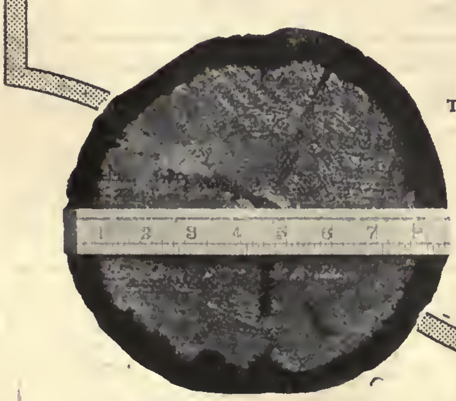

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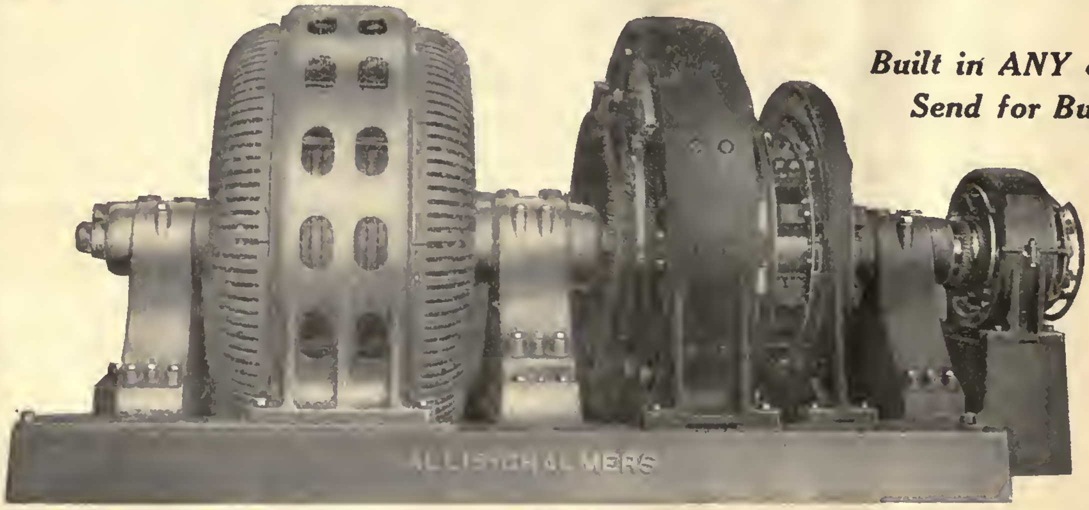

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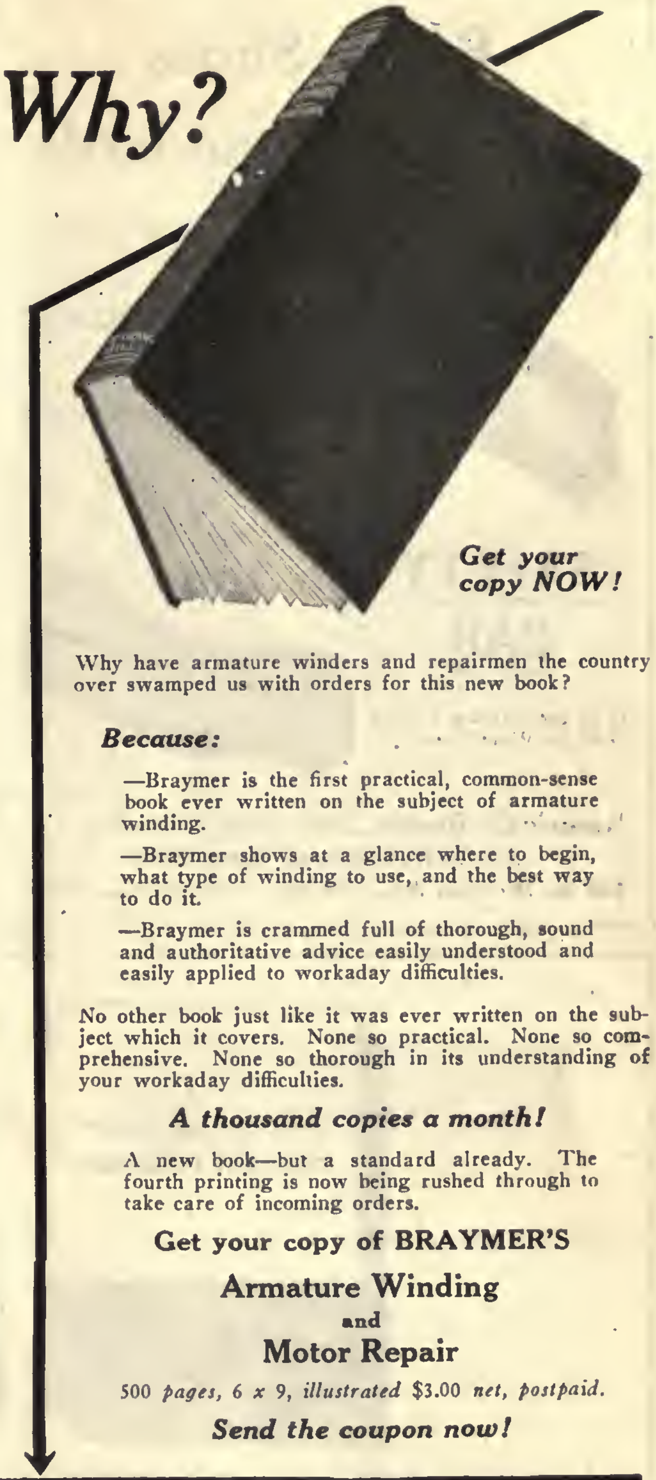

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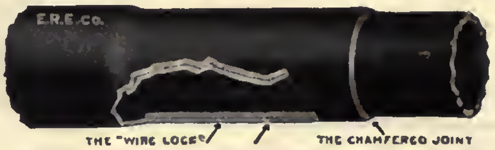

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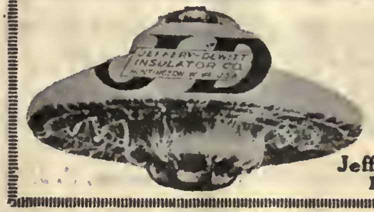

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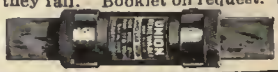

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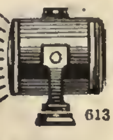

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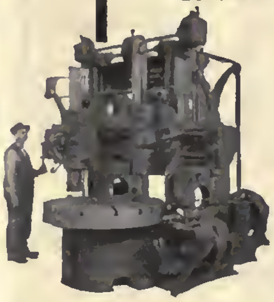
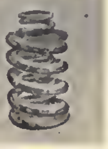


NILES-BEMENT-POND CO.
111 BROADWAY, NEW YORK

MACHINE TOOLS
FOR ELECTRIC RAILWAYS

Axle Lathes
Wheel Presses
Car Wheel Lathes
Boring Mills
Lathes
Hammers
Cranes
General Machine Tools



FORT PITT SPRING AND MANUFACTURING CO.
PITTSBURGH, PA.
Manufacturers of
COIL AND ELLIPTIC
SPRINGS
FOR
RAILWAY SERVICE

FORD TRIBLOC

A Chain Hoist that excels in every feature. It has Planetary Gears, Steel Parts, 3½ to 1 factor of Safety. It's the only Block that carries a five-year guarantee.

FORD CHAIN BLOCK CO.
Second and Diamond Sts., Philadelphia

THE SCOOP CONVEYOR
THOUSANDS IN USE
FOR STORING AND RECLAIMING, LOADING AND UNLOADING CARS, TRUCKS AND WAGONS
DOES THE WORK OF FROM 6 TO 12 MEN
AND KEEPS EQUIPMENT MOVING
WRITE FOR LITERATURE
PORTABLE MACHINERY CO., PASSAIC N.J.

SPECIFY
THE TERRY TURBINE
For Driving Your Auxiliaries
TERRY STEAM TURBINE CO.
Hartford, Conn

Use them in your terminals—
PEREY TURNSTILES
or PASSIMETERS
Faster than the ticket seller
Perey Manufacturing Co., Inc.
30 Church Street, New York City

BUCKEYE JACKS
high-grade R. R. Track and Car Jacks.
The Buckeye Jack Mfg. Co.
Alliance, Ohio

WHITING CORPORATION
(formerly Whiting Foundry Equipment Co.)
General Offices and Works: Harvey, Ill.
CRANES OF ALL TYPES
FOUNDRIES EQUIPPED COMPLETE

ELECTRICAL CONDUITS AND FITTINGS
— WRITE FOR BULLETINS —
National Metal Molding Co.
PITTSBURGH, PA.

INTERNATIONAL FARE REGISTER

Type R-10
Single Register

International Fare Registers. Single registers, round and square; double registers, duplex counters, car fittings, foot-operating devices for single and double registers. Exclusive selling agents for Heeren enamel cap and coat badges.

The International Register Co.
15 South Throop Street, Chicago

The Cleveland FITS the FARE and FARE COLLECTION SYSTEM. If you have a fare collection problem let us help you.

Write us.

The Cleveland
Fare Box Company
Cleveland, Ohio
Canadian Branch: Preston, Ontario

HIGH SPEED MONEY CHANGERS

Standard equipment of largest Traction Companies

There is a combination for your requirements

Consider the time lost when making change for passengers. Eliminate unnecessary delays. Supply High Speed Money Changers to your conductors. Prices and literature on request.

J. L. GALEF, 75 Chambers St., New York City
Exclusive Manufacturers' Selling Agent

DREW MOTORMEN'S SAFETY MIRRORS

Eliminate Accidents

Send for Catalogue No. 18

DREW ELECTRIC & MFG. CO.
Collamer Ave. and Nickel Plate Railroad, Cleveland, O.

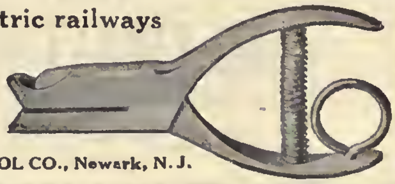
SAMSON SPOT WATERPROOFED TROLLEY CORD

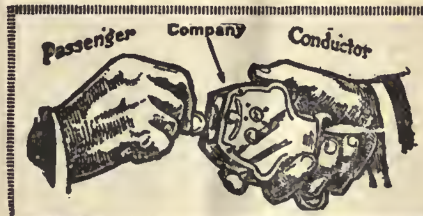
Trade Mark Reg. U. S. Pat. Off.
Made of extra quality stock firmly braided and smoothly finished.
Carefully inspected and guaranteed free from flaws.
Samples and information gladly sent.
SAMSON CORDAGE WORKS, BOSTON, MASS.

75% of the electric railways use

B-V Punches

Send for Catalog.
BONNEY-VEHSLAGE TOOL CO., Newark, N. J.





Direct Automatic Registration By the Passenger

Rooke Automatic Register Co.
Providence, R. I.

162 RAILROADS
USE DIXIE CUP
Penny Vending Machines
To Solve their Drinking Cup Problems in Cars and Stations
INDIVIDUAL DRINKING CUP COMPANY, Inc.
HUGH MOORE, President
Original Makers of the Paper Cup — 220-230 W. 19th Street New York

Heating and Ventilating

Let us demonstrate to you how we can heat and ventilate your cars at the lowest possible cost

The Cooper Heater Company
Carlisle, Pa.

PROVIDENCE FENDERS

H-B LIFE GUARDS

The Consolidated Car Fender Co., Providence, R. I.
Wendell & MacDuffie Co., 61 Broadway, New York
General Sales Agents

Electric car heaters—thermostatic control—pneumatic car door operators—buzzers, single-stroke bells, starting signal lights—special resistances.

CONSOLIDATED CAR HEATING CO.
ALBANY, NEW YORK, CHICAGO

ELECTRIC RAILWAY JOURNAL

Think "SEARCHLIGHT" First

ADVERTISING RATES

POSITIONS VACANT—Business Opportunities and other undisplayed ads, 8 cents a word, minimum $2.00 an insertion.

POSITIONS WANTED—Evening work wanted, tutoring and other undisplayed ads of individuals looking for employment, 4 cents a word, minimum 75 cents, payable in advance.

ADD 5 WORDS for box number in undisplayed ads if replies are to any of our offices. There is no extra charge for forwarding replies.

DISCOUNT OF 10% if one payment is made in advance for 4 consecutive insertions of undisplayed ad.

ADS IN DISPLAY TYPE—Space is sold by the inch (30 in. to a page), the price depending upon total space used within a year, some space to be used each issue.

RATE PER INCH for ads in display space:

1 to 3 in., $4.50 an in.	15 to 29 in., $3.90 an in.
4 to 7 in., $4.30 an in.	30 to 49 in., $3.80 an in.
8 to 14 in., $4.10 an in.	50 to 99 in., $3.70 an in.

POSITIONS VACANT

EMPLOYMENT

POSITIONS WANTED

POSITIONS VACANT

ENGINEER wanted, track supervisor. Man qualified to look after maintenance and upkeep of about one hundred miles of surface track and overhead lines. Must be familiar with preparation of estimates, supervision of actual work and cost accounting. State salary expected. P-830, Elec. Ry. Journal, Real Estate Trust Bldg., Philadelphia, Pa.

MASTER mechanic wanted for Middle West on a division operating 40 interurbans on 600-1,200 volts. P-787, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

SUPERINTENDENT for small, growing property. Excellent opening for bright, active, ambitious man, thoroughly familiar with street railway operation and construction. Address, stating age, experience and salary expected, F. D. Sullivan, General Manager, Iron River, Michigan.

TECHNICALLY trained man to take charge of and coordinate efforts in small drawing office of street railway corporation. Should have executive ability and some track and building experience. Chance for advancement. Must be Canadian citizen. State age experience and salary expected. P-829, Elec. Ry. Journal.

TRAIN dispatcher on electric line wanted: Second trick, hours 2 p.m. to 11 p.m. Salary $190 per month. System operates about 60 miles of street and interurban railway in a rapidly growing community. Apply to Gary Street Railway Co., 567 Broadway, Gary, Indiana.

POSITIONS WANTED

EDITORIAL and news writer who is familiar with public relations problems confronting utility operators and who can, by his efforts, produce results that are tangible, is open for engagement. Present connection as editor and manager of a monthly public service magazine terminates March 1st. PW-827, Elec. Ry. Journal.

EXPERIENCED outside construction man desires position in way of electric railway, lighting, underground and submarine cables. Most experience in city of 200,000 population. Can produce results. PW-828, Elec. Ry. Journal, Real Estate Trust Bldg., Phila.

MANAGER, fully qualified from ground up, having passed through all departments and holding such positions as president and general manager. Now employed but desires better prospects, prefer property where there is hard work and produce results. PW-825, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

POSITION wanted by experienced armature winder, car wireman, general repair man, shop foreman and master mechanic would like to locate in Central States either as master mechanic shop foreman or department foreman. Can get results from men and equipment; first-class reference.. State your full proposition in first letter. PW-825, Elec. Ry. Journal, Real Estate Trust Bldg., Philadelphia.

In Replying to "Blind" Ads

be careful to put on envelope the key number in the ad and also local address of office to which reply is sent.

10th Ave. at 36th St., New York.
935 Real Estate Trust Bldg., Phila.
533 Leader-News Bldg., Cleveland.
1570 Old Colony Bldg., Chicago.
531 Rialto Bldg., San Francisco.

Important

Original letters of recommendation or other papers of value should not be enclosed to unknown correspondents — send copies.

0195

POSITIONS WANTED

SUPERINTENDENT of transportation, desires a change; age 41, clean, capable, progressive, possessing a full knowledge of transportation details, having 18 years' experience dealing with public and labor. Fully capable of taking over details of any city or suburban property and getting results. Will consider any proposition that requires hard work and extra effort to get results. Best of references as to character and ability. Address giving details. PW-826, Elec. Ry. Journal, Old Colony Bldg., Chicago.

AGENT AND SALESMAN

Pacific Coast Sales Representation

A thoroughly practical, experienced and responsible sales engineer, possessing unusually wide and favorable acquaintance from Omaha, Nebraska to Pacific Coast with users and buyers of material and equipment designed for use of steam and electric railroads, shipbuilding, electric light and power, hydroelectric, telephone, building and construction industries, mines, desires to form a connection with responsible manufacturer as sales representative, for distribution of product throughout Pacific Coast territory, with headquarters in San Francisco, California; will consider mechanical or electrical line or specialties, gas or electric welding and cutting equipment, metal products, wire or building and construction material possessing utility and merit; on commission basis or otherwise; advertiser will assume cost of operation and traveling; effective and profitable sales results assured. Highest credentials available on demand; correspondence invited. Robert A. Paterson, 30 Church Street, New York City.

AGENT AND SALESMAN

FOR SALE

Complete Power Plant

With appurtenances, now in operation, installed five years ago. 150 h.p, 3 cylinder Gas Oil engine, 250 r.p.m., direct connected 100 kilowatt, 600 Volt direct current Railway generator with switch board complete. Storage tanks, air reservoirs, compressor, piping, etc. Guaranteed first-class outfit. Making room larger plant. Low cash price for quick sale. Address,

Bryan & College Interurban Ry.
Bryan, Tex.

New—Used—Rebuilt

MACHINERY AND SUPPLIES
for construction and industrial work

READING ENGINEERING CO., INC.
154 Nassau St., New York

COMPLETE POWER PLANT

FOR SALE

1—500 h.p. Westinghouse Compound Engine, Direct Connected to 550 volt Generator.

2—200 h.p. Harrisburg Engines, Belt Connected to Westinghouse Generators.

1—B & W Boiler, 2 Keeler Boilers, Water Heaters, Pumps, Piping, Switchboards and etc.

All in first class operating condition. Immediate delivery. Make us an offer.

The Lewistown & Reedsville Electric Railway Co., Lewistown, Pa.

WHEEL PRESS

84-in 300 ton Schafer Hydraulic Wheel Press; Belt Driven with three pumps; 12-in. Ram; First class condition. Price very reasonable.

ARTHUR S. PARTRIDGE
415 Pine Street, Saint Louis

For 20 Years

we have been
Buying and Selling
Second-Hand Cars
Trucks and Motors
At Your Service

ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa.

EVERYTHING FOR TRACK

New and Relaying Rail
FITTINGS AND TOOLS

TRACK SPECIALTIES CO.
29 Broadway, New York City.

FOR SALE

Two 300-H.P. 500 Volt MILL MOTORS

Two Westinghouse 300-h.p. 345 to 500 r.p.m., 500 volt, D.C., compound wound motors, with one spare armature, including two Cutler-Hammer, 300-h.p., 500 volt, D.C. Starters.

Condition good. Ready for inspection. Reason for selling, voltage changed. Write

H. LLEWELLYN, General Purchasing Agent
PITTSBURGH STEEL PRODUCTS CO.
Union Arcade Bldg., Pittsburgh, Pa.

NEW
REBUILT

ELECTRIC MOTORS

REWINDING
REPAIRING

NEW A.C. MOTORS ¼ to 15 H.P.—LARGE STOCK USED MOTORS
EXCELLENT REPAIR SERVICE ON ANY SIZE OR TYPE

CLEVELAND ARMATURE WORKS, INC.
EST. 1895 4732-4-6 ST. CLAIR AVE., CLEVELAND O. *INC. 1918*

Service Value

Scrap value for idle used machinery or surplus material is not enough. If it can be used by others they will pay *service value* for it. "Searchlight" will find these buyers for you.

Manufacturers who accept used machinery in part payment for new can dispose of it promptly by advertising in the Searchlight Section.

Machinery used in manufacturing and displaced by other equipment can be sold at a fair price by advertising it in the Searchlight Section.

Wide-awake dealers, agents or representatives can be secured through little Searchlight "Want" ads.

Manufacturing sites, partners, help, capital—anything that anybody in the machinery field is likely to have for sale or exchange for something else—can be located or disposed of through the Searchlight Section.

The cost of putting your Wants in this projector is very slight, whether for a man, for a job or for a market.

Searchlight Section

MACHINERY IN STOCK FOR IMMEDIATE SHIPMENT

STEAM TURBO GENERATING SETS

1—10.000 kw. (12,500 kva.) Westg. 3 ph., 60 cy., 13200 v., 1800 r.p.m. Turbo Unit with Le Blanc Jet Condenser.
1—1500 kva., 2300 v., 3 ph., 60 cy., 3600 r.p.m. Gen. Elec. Turbo Outfit with condensing equipment.
1—1500 kva. Gen. Elec. Curtis 25 cycle turbo unit, 3 ph., 1500 r.p.m., 370 volts, 175 lb. steam pressure.
1—400 kw. Westg., 3 ph., 60 cy., 2200 v., 3600 r.p.m. turbo unit.

FREQUENCY CHANGER SETS

1—1000 kw., 1250 kva., G. E., 2 ph., 62.6 cy., 5400/2700 v., 375 r.p.m. generator dir. ctd. to 1060 hp., 3 ph., 25 cy., 6600 v., 375 r.p.m. motor.
1—500 kw., G. E., 2 ph., 60 cy., 2300 v., 750 r.p.m. generator dir. ctd. to 700 hp., 3 ph., 25 cy., 13200 v., 750 r.p.m. motor.
1—500 kw., G.E., 3 ph., 60 cy., 4150 v., 300 r.p.m. generator dir. ctd. to 800 hp., 3 ph., 25 cy., 9060 v., 300 r.p.m. motor.

MOTOR GENERATOR SETS

1—1000 kw., Westg., 125/250 v., 294 r.p.m. generator dir. ctd. to 1400 hp., 3 ph., 60 cy., 6600/4000 v., 294 r.p.m. motor.
1—200 kw., G. E., 250 v., 600 r.p.m. generator dir. ctd. to 300 hp., 2 ph., 60 cy., 2400 v., 900 r.p.m. motor.
2—100 kw., Westg., 6 pole, 600 v., gen., each dir. ctd. to 150 hp., 2 ph., 25 cy. motor. These are self contained units on cast iron sub-bases.

ROTARY CONVERTERS

1—500 kw., Westg., rotary, 6 ph., 25 cy., 440 v., A.C., 600 v., D.C., 500 r.p.m.
1—600 kw., Gen. Elec., rotary, 600 volt. 60 cy., 1200 r.p.m.
2—300 kw., Westg., 3 ph., 60 cy., 370 v., A.C., 600 v., D.C., 600 r.p.m.
2—200 kw., G. E., 25 cy., 370 v., A.C., 600 v., D.C., 750 r.p.m.
1—150 kw., Westg., 3 ph., 60 cy., 370 v., A.C., 575 v., D.C., 720 r.p.m.
2—150 kw., Gen. Elec., 25 cy., 370 v., A.C., 600 v., D.C., 750 r.p.m.

TRANSFORMERS—25 CY.

6—500 kva., G. E., 13200 prim., 480 secy.
3—200 kva., Westg., 16500 v., prim., 460 secy.
3—200 kw., G. E., 6450 v., prim., 170 secy.
3—165 kva., G. E., 2300 v., prim., 430 secy.
3—150 kw., G. E., 6000 v., prim., 83 secy.
3—125 kw., Westg., 2200 v., prim., 220 secy.
2—75 kva., G. E., 13800 v., prim., 115/230 secy.
3—50 kva., G. E., 13600 v., prim., 115/230 secy.

TRANSFORMERS—60 CY.

1—7500 kva., Westg., 44000/22000-13500 vs.
3—2000 kva., G. E., 66000 v., prim., 6600-13200/22000 v., Y secy.
3—2000 kva., G. E., 66000-2200/4000 Y vs.
2—1250 kva., 3 ph., G. E., 26400/13200 prim., 2400/2200 v., secy.
4—750 kw., G. E., 44000/43000/42000 prim., 6600 secy.
6—600 kva., G. E., 33000/13200 volts.
3—400 kva., Allis-Chalmers, 6000-440 vs.
3—200 kva., G. E., 2200 prim., 370 secy.
3—150 kva., G. E., 6000-120/240 volts.
4—150 kw., Allis-Chalmers, 33000 v., prim., 2300 secy.
6—110 kw., G. E., 14500-13050 v., prim., 430-286-143 v., secy.
3—100 kw., G. E., 9200 v., prim., 2300 secy.
2—100 kw., G. E., 6600/5740 prim., 2760/2400 secy.
3—100 kw., G. E., 6600 v., prim., 605/384 secy.
3—100 kva., Westg., 11000-500 volts.
3—100 kw., Westg., 440 v., prim., 220 secy.
3—75 kva., G. E., 11000/9800-6600 vs.
3—75 kva., G. E., 2300 v., prim., 370 secy.
3—75 kva., Allis-Chal., 6600 v., prim., 440 secy.
3—55 kw., G. E., 2300/2070-370/330/165 vs.
3—50 kva., Westg., 6600/6300/6000 v., prim., 440/220 secy.
2—50 kw., Westg., 5000/6600 v., prim., 1000/1100/2000/2300 v., secy.

ARCHER & BALDWIN, Inc.

Telephone 4337-4338 Rector

114-118 Liberty Street, New York City

NEW—80-LB. RAIL and ACCESSORIES

Angle Bars, Spikes, Bolts and Nuts Complete

FOR SALE

A.R.A. "TYPE B" RAIL

Approximately 30,000 gross tons—standard lengths

Stored at Kearney, New Jersey

We buy electric and steam railways that are to be dismantled

HYMAN-MICHAELS COMPANY

NEW AND RELAYING RAILS

Peoples Gas Building, Chicago, Ill.

New York Office:	Pittsburgh Office:	St. Louis Office:
1324-1326 Woolworth Bldg.	1312 First National Bank Bldg.	2115 Railway Exchange Bldg.

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
- Collier, Inc., Barron G.

Air Aftercoolers
- Chicago Pneumatic Tool Co.
- Ingersoll-Rand Co.

Air Receivers
- Chicago Pneumatic Tool Co.
- Ingersoll-Rand Co.

Anchors, Guy
- Electric Service Supplies Co.
- Ohio Brass Co.
- Western Electric Co.
- Westinghouse Elec. & Mfg. Co.

Angle Bars
- Lackawanna Steel Co.

Automobiles and Buses
- Brill Co., The J. G.

Axles
- Bemis Car Truck Co.
- St. Louis Car Co.

Axles, Car Wheel
- Bemis Car Truck Co.
- Brill Co., The J. G.
- Carnegie Steel Co.
- Standard Steel Works Co.
- Westinghouse Elec. & Mfg. Co.

Axle Straighteners
- Columbia M. W. & M. I. Co.

Babbitt Metal
- Ajax Metal Co.
- More-Jones Brass & Metal Co.

Babbitting Devices
- Columbia M. W. & M. I. Co.

Badges and Buttons
- Electric Service Supplies Co.
- International Register Co., The
- Western Electric Co.

Batteries Dry
- Western Electric Co.

Batteries, Storage
- Electric Storage Battery Co.
- Western Electric Co.

Bearings and Bearing Metals
- Ajax Metal Co.
- Bemis Car Truck Co.
- Columbia M. W. & M. I. Co.
- General Electric Co.
- More-Jones Brass & Metal Co.
- St. Louis Car Co.
- Westinghouse Elec. & Mfg. Co.

Bearings, Center and Roller Side
- Stucki Co., A.

Bells and Gongs
- Brill Co., The J. G.
- Columbia M. W. & M. I. Co.
- Electric Service Supplies Co.
- St. Louis Car Co.
- Western Electric Co.

Benders, Rail
- Niles-Bement-Pond Co.

Boilers
- Babcock & Wilcox Co.

Boiler Tubes
- National Tube Co.

Bond Testers
- American Steel & Wire Co.

Bonding Apparatus
- American Steel & Wire Co.
- Electric Service Supplies Co.
- Ohio Brass Co.

Bonds, Rail
- American Steel & Wire Co.
- Copper Clad Steel Co.
- Electric Service Supplies Co.
- General Electric Co.
- Ohio Brass Co.
- Westinghouse Elec. & Mfg. Co.

Book Publishers
- McGraw-Hill Book Co., Inc.

Boring Tools, Car Wheel
- Niles-Bement-Pond Co.

Boxes—Junction & Outlet
- National Metal Molding Co.

Brackets and Cross Arms (See also Poles, Ties, Posts, Etc.)
- American Bridge Co.
- Bates Expanded Steel Truss Co.
- Electric Railway Equipment Co.
- Electric Service Supplies Co.
- Hubbard & Co.
- Ohio Brass Co.
- Western Electric Co.

Brake Adjusters
- National Ry. Appliance Co.
- Westinghouse Traction Brake Co.

Brake Shoes
- Amer. Brake Shoe & Fdry. Co.
- Barbour-Stockwell Co.
- Bemis Car Truck Co
- Brill Co., The J. G.
- Columbia M. W. & M. I. Co.
- St. Louis Car Co.

Brakes, Brake Systems and Brake Parts
- Allis-Chalmers Mfg. Co.
- Bemis Car Truck Co.
- Brill Co., The J. G.
- Columbia M. W. & M. I. Co.
- General Electric Co.
- National Brake Co.
- Safety Car Devices Co.
- St. Louis Car Co.
- Westinghouse Traction Brake Co.

Bridges and Buildings
- American Bridge Co.

Brooms, Track, Steel or Rattan
- Western Electric Co.
- Zelnicker, W. A., Supply Co., Inc.

Brushes, Carbon
- Corliss Carbon Co.
- General Electric Co.
- Jeandron, W. J.
- Morganite Brush Co., Inc.
- United States Graphite Co.
- Western Electric Co.
- Westinghouse Elec. & Mfg. Co.

Brush Holders
- Anderson Mfg. Co., A. & J. M.
- Columbia M. W. & M. I. Co.

Bunkers, Coal
- American Bridge Co.

Bushings
- National Metal Molding Co.

Bushings, Case Hardened and Manganese
- Bemis Car Truck Co.

Bushings, Graphite and Wooden
- Bound Brook Oilless Bearing Co.

Cables (See Wires and Cables)

Carbon Brushes (See Brushes, Carbon)

Car Panel Safety Switches
- Westinghouse Elec. & Mfg. Co.

Cars, Dump
- Differential Car Co.

Cars, Passenger, Freight, Express, etc.
- American Car Co.
- Brill Co., The J. G.
- Kuhlman Car Co., G. C.
- McGuire-Cummings Mfg. Co.
- National Ry. Appliance Co.
- St. Louis Car Co.
- Wason Mfg. Co.

Cars, Second Hand
- Electric Equipment Co.

Cars, Self-Propelled
- Electric Storage Battery Co.
- General Electric Co.

Castings, Brass, Composition or Copper
- Ajax Metal Co.
- Anderson Mfg. Co., A. & J. M.
- Columbia M. W. & M. I. Co.
- Eureka Co.
- More-Jones Brass & Metal Co.

Castings, Gray Iron and Steel
- American Bridge Co.
- Bemis Car Truck Co.
- Columbia M. W. & M. I. Co.
- Standard Steel Works Co.
- St. Louis Car Co.

Castings, Malleable and Brass
- Amer. Brake Shoe & Fdry. Co.
- Bemis Car Truck Co.
- Columbia M. W. & M. I. Co.
- St. Louis Car Co.

Catchers and Retrievers, Trolley
- Ackley Brake & Supply Corp.
- Electric Service Supplies Co.
- Ohio Brass Co.
- Wood Co., Chas. N.

Ceiling, Car (See Headlining)

Change Carriers
- Galef, J. L.

Circuit Breakers
- Automatic Reclosing Circuit Breaker Co.
- General Electric Co.
- Western Electric Co.
- Westinghouse Elec. & Mfg. Co.

Clamps and Connectors for Wires and Cables
- Anderson Mfg. Co., A. & J. M.
- Electric Railway Equipment Co.
- Electric Service Supplies Co.
- General Electric Co.
- Hubbard & Co.
- Ohio Brass Co.
- Western Electric Co.
- Westinghouse Elec. & Mfg. Co.

Cleaners and Scrapers—Track (See also Snow-Plows, Sweepers and Brooms)
- Brill Co., The J. G.
- Ohio Brass Co.
- Western Electric Co.

Cleats
- National Metal Molding Co.

Clusters and Sockets
- General Electric Co.

Coal and Ash Handling (See Conveying and Hoisting Machinery)

Coil Banding and Winding Machines
- Columbia M. W. & M. I. Co.
- Electric Service Supplies Co.
- Western Electric Co.

Coils, Armature and Field
- Cleveland Armature Works
- Columbia M. W. & M. I. Co.
- General Electric Co.
- Westinghouse Elec. & Mfg. Co.

Coils, Choke and Kicking
- Electric Service Supplies Co.
- General Electric Co.
- Westinghouse Elec. & Mfg. Co.

Coin-Counting Machines
- Electric Service Supplies Co.
- International Register Co., The
- Johnson Fare Box Co.

Commutator Slotters
- Electric Service Supplies Co.
- General Electric Co.
- Westinghouse Elec. & Mfg. Co.

Commutator Truing Devices
- General Electric Co.

Commutators or Parts
- Cameron Electrical Mfg. Co.
- Cleveland Armature Works
- Columbia M. W. & M. I. Co.
- General Electric Co.
- Westinghouse Elec. & Mfg. Co.
- Western Electric Co.

Compressors, Air
- Allis-Chalmers Mfg. Co.
- Chicago Pneumatic Tool Co.
- General Electric Co.
- Ingersoll-Rand Co.
- Westinghouse Trac. Brake Co.

Compressors, Gas
- Ingersoll-Rand Co.

Condensers
- Allis-Chalmers Mfg. Co.
- General Electric Co.
- Schutte & Koerting Co.
- Westinghouse Elec. & Mfg. Co.

Conduit Fittings
- Chicago Fuse Mfg. Co.

Conduits Interior
- National Metal Molding Co.

Conduits, Underground
- Western Electric Co.

Connectors, Solderless
- Frankel Connector Co.
- Westinghouse Elec. & Mfg Co.

Controller Fingers
- Russell Mfg. Co.

Controllers or Parts
- Allis-Chalmers Mfg. Co.
- Columbia M. W. & M. I. Co.
- General Electric Co.
- Russell Mfg. Co.
- Westinghouse Elec. & Mfg. Co.

Controller Regulators
- Elec. Service Supplies Co.

Controlling Systems
- General Electric Co.
- Westinghouse Elec. & Mfg. Co.

Converters, Rotary
- Allis-Chalmers Mfg. Co.
- General Electric Co.
- Western Electric Co.
- Westinghouse Elec. & Mfg. Co.

Conveyors, Belt
- Portable Machinery Co.

Conveyors, Coal and Ash
- Green Eng. Co.
- Portable Machinery Co.

Conveyors, Portable
- Portable Machinery Co.

Conveying and Hoisting Machinery
- Allis-Chalmers Mfg. Co.
- American Bridge Co.
- Columbia M. W. & M. I. Co.
- Portable Machinery Co.

Copper Wire
- Anaconda Copper Mining Co.
- Copper Clad Steel Co.

Cord, Bell, Trolley, Register, etc.
- Brill Co., The J. G.
- Electric Service Supplies Co.
- International Register Co., The
- Roebling's Sons Co., John A.
- Samson Cordage Works

Cord Connectors and Couplers
- Electric Service Supplies Co.
- Samson Cordage Works
- Wood Co., Chas. N.

Couplers, Car
- Brill Co., The J. G.
- Ohio Brass Co.
- Westinghouse Trac. Brake Co.

Cranes
- Allis-Chalmers Mfg. Co.
- Niles-Bement-Pond Co.
- Whiting Corp.

Cross Arms (See Brackets)

Crossing Foundations
- International Steel Tie Co.

Crossing Signals (See Signals, Crossing)

Crossings, Frog and Switch
- Wharton, Jr., & Co., Wm.

Crossings, Track (See Track, Special Work)

Curtains and Curtain Fixtures
- Brill Co., The J. G.
- Du Pont Fabrikoid Co.
- Electric Service Supplies Co
- Pantasote Co.
- St. Louis Car Co.

Cutouts
- Chicago Fuse Mfg Co.

Dealers', Machinery
- Archer & Baldwin
- Electric Equipment Co.
- Foster Co., L. B.
- Hyman Michaels Co.

Derailing Devices (See also Track Work)
- Wharton, Jr., & Co., Wm.

Destination Signs
- Columbia M. W. & M. I. Co.
- Electric Service Supplies Co.

Detective Service
- Wish Service, P. Edward

Dogs, Lathe
- Williams & Co., J. H.

Door Operating Devices
- Consolidated Car Heating Co.
- National Pneumatic Co., Inc.
- Safety Car Devices Co.

Doors and Door Fixtures
- Brill Co., The J. G.
- General Electric Co.

Doors, Folding Vestibule
- National Pneumatic Co., Inc

Draft Rigging (See Couplers)

Drills, Rock
- Chicago Pneumatic Tool Co.
- Ingersoll-Rand Co.

Drills, Track
- American Steel & Wire Co
- Chicago Pneumatic Tool Co.
- Electric Service Supplies Co.
- Niles-Bement-Pond Co.
- Ohio Brass Co.

Drinking Cups, Sanitary Paper
- Individual Drinking Cup Co., Inc.

Dryers, Sand
- Electric Service Supplies Co.
- Zelnicker Supply Co., Inc., Walter A.

Electrical Wires and Cables
- American Steel & Wire Co.
- Roebling's Sons Co., J. A.

Electric Tools
- Chicago Pneumatic Tool Co.

Engineers, Consulting, Contracting and Operating
- Allison & Co., J. E.
- Archbold-Brady Co.
- Arnold Co The
- Clark & Co., Mgr., Corp., E. W.
- Day & Zimmermann
- Feustel, Robert M.
- Ford, Bacon & Davis
- Hemphill & Wells
- Holst, Englehardt W.
- Jacobs & Co., J. L.
- Jackson, Walter
- Parsons, Klapp, Brinkerhoff & Douglas
- Republic Engineers, Inc.
- Richey, Albert S.
- Sanderson & Porter
- Scofield Engineering Co.
- Stone & Webster
- White Engineering Corp., The J. G.

Engines, Gas, Oil or Steam
- Allis-Chalmers Mfg. Co.
- Chicago Pneumatic Tool Co.
- Ingersoll-Rand Co.
- Westinghouse Elec. & Mfg. Co

Fare Boxes
- Brill Co., The J. G.
- Cleveland Fare Box Co.
- Johnson Fare Box Co.
- National Railway Appliance Co.

B. A. Hegeman, Jr., President; Charles C. Castle, First Vice-President; Harold A. Hegeman, Vice-President and Treasurer; Fred C. J. Dell, Secretary; W. C. Lincoln, Manager Sales and Engineering.

National Railway Appliance Co.

50 East 42nd St., NEW YORK CITY
Hegeman-Castle Corporation, 343 So. Dearborn St., Chicago, Ill.
National Railway Appliance Co., Munsey Bldg., Washington, D. C.
National Railway Appliance Co., Little Bldg., Boston, Mass.

RAILWAY SUPPLIES

Tool Steel Gears and Pinions, Anderson Slack Adjusters, Genesco Paint Oils, Dunham Hopper Door Device, Feasible Drop Brake Staffs, Anglo-American Varnishes, Paints, Enamels, Surfaces, Shop Cleaner, Johnson Fare Boxes, Drew Line Material and Railway Specialties, Perry Side Bearings, Miller Trolley Shoes, Hartman Centering Center Plates, Economy Power Saving Meters, H. and W. Electric Heaters, Garland Ventilators, Pitt Sanders, National Safety Car Equipment Co.'s One-Man Safety Cars, Flaxlinum Insulation.

The Kalamazoo Trolley Wheels

have always been made of entirely new metal, which accounts for their long life WITHOUT INJURY TO THE WIRE. Do not be misled by statements of large mileage, because a wheel that will run too long will damage the wire. If our catalogue does not show the style you need, write us—the LARGEST EXCLUSIVE TROLLEY WHEEL MAKERS IN THE WORLD.

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KALAMAZOO, MICH., U. S. A.

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wears longer—runs cooler—costs less

used by electric railways at home and abroad

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made from the purest virgin metals to a scientifically correct formula by the AJAX PROCESS which greatly increases endurance and wearing qualities.

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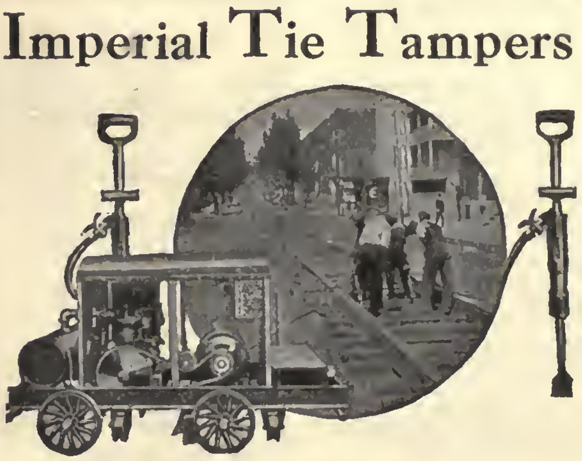
Oliver Bldg.
Pittsburgh, Pa.

THE DIFFERENTIAL STEEL CAR CO.

H. Fort Flowers, Pres. & Gen. Mgr.
FINDLAY, OHIO

Imperial Tie Tampers



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Electric or Gasoline Power

Let us send you Bulletin 9123

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General Offices—111 West Monroe St., CHICAGO

City and Interurban Cars and Trucks, Snow Sweepers and Plows

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The "Hycap-Exide" Battery

for

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THE ELECTRIC STORAGE BATTERY CO
PHILADELPHIA

WHAT AND WHERE TO BUY

Feed Water Heating
Schutte & Koerting Co.

Fences, Woven Wire and Fence Posts
American Steel & Wire Co.

Fenders and Wheel Guards
Brill Co., The J. G.
Cleveland Fare Box Co.
Consolidated Car Fender Co.
Electric Service Supplies Co.
Western Electric Co.

Fibre and Fibre Tubing
Continental Fibre Co.
Westinghouse Elec. & Mfg. Co.

Field Coils (See Coils)

Filters, Water
Scaife & Sons Co., Wm. B.

Floodlights
Electric Service Supplies Co.

Flooring Composition
American Mason Safety Tread Co.
Western Electric Co.

Forgings
Carnegie Steel Co.
Columbia M. W. & M. I. Co.
Standard Steel Works Co.
Williams & Co., J. H.

Foundry Equipment
Whiting Corp.

Frogs, Track (See Track Work)

Funnel Castings
Wharton, Jr., & Co., Inc., Wm.

Fuses and Fuse Boxes
Chicago Fuse Mfg. Co.
Columbia M. W. & M. I. Co.
General Electric Co.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.
Williams & Co., J. H.

Fuses, Refillable
Chicago Fuse Mfg. Co.
Columbia M. W. & M. I. Co.
General Electric Co.

Gages, Oil and Water
Ohio Brass Co.

Gaskets
Power Specialty Co.
Westinghouse Traction Brake Co.

Gas-Electric Cars
General Electric Co.

Gas Producers
Westinghouse Elec. & Mfg. Co.

Gates, Car
Brill Co., The J. G.

Gear Blanks
Carnegie Steel Co.
Standard Steel Works Co.

Gear Cases
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Westinghouse Elec. & Mfg. Co.

Gears and Pinions
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
National Railway Appliance Co.
Nuttall Co., R. D.
Tool Steel Gear & Pinion Co.

Generating Sets, Gas-Electric
General Electric Co.

Generators
Allis-Chalmers Mfg. Co.
General Electric
Western Electric Co.
Westinghouse Elec. & Mfg. Co.

Gongs (See Bells and Gongs)

Grates, Chain
Green Eng. Co.

Greases (See Lubricants)

Grinders and Grinding Supplies
Chicago Pneumatic Tool Co.
Metal & Thermit Corp.
Railway Track-work Co.
Western Electric Co.

Grinding Blocks and Wheels
Railway Track-work Co.

Guards, Cattle
American Bridge Co.

Guards, Trolley
Electric Service Supplies Co.
Ohio Brass Co.

Harps, Trolley
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
More-Jones B. & M. Co.
Nuttall Co., R. D.
Star Brass Works
Western Electric Co.

Headlights
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
St. Louis Car Co.

Headlining
Pantasote Co.

Heaters, Car (Electric)
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
National Ry. Appliance Co.
Smith Heater Co., Peter.

Heaters, Car, Hot Air and Water
Cooper Heater Co.
Smith Heater Co. Peter

Heaters, Car (Stove)
Electric Service Supplies Co.
Smith Heater Co., Peter

Hoists and Lifts
Chicago Pneumatic Tool Co.
Columbia M. W. & M. I. Co.
Ford-Chain Block Co.
Niles-Bement-Pond Co.

Hose
Chicago Pneumatic Tool Co.
Ingersoll-Rand Co.

Hose, Bridges
Ohio Brass Co.

Hydraulic Machinery
Allis-Chalmers Mfg. Co.
Niles-Bement-Pond Co.

Injectors
Schutte & Koerting Co.

Inspection
Electrical Testing Lab's

Institutions, Educational
Hamilton Institute, Alexander

Instruments, Measuring, Testing and Recording
General Electric Co.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.

Insulating Cloth, Paper and Tape
General Electric Co.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.

Insulating Materials, China & Porcelain
Jeffrey-Dewitt Insulator Co.

Insulation (See also Paints)
Anderson Mfg. Co., A. & J. M.
Electric Ry. Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.

Insulators, China, Porcelain & Composition
Jeffrey-Dewitt Insulator Co.

Insulators (See also Line Material)
Anderson Mfg. Co., A. & J. M.
Drew Electric & Mfg. Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.

Insulator Pins
Electric Service Supplies Co.
Hubbard & Co.

Insulators, Section
Flood City Mfg. Co.

Jacks (See also Cranes, Hoists and Lifts)
Brill Co., The J. G.
Buckeye Jack Mfg. Co.
Columbia M. W. & M. I. Co.

Joints, Rail
Carnegie Steel Co.
Lackawanna Steel Co.
Zelnicker Supply Company, Inc., Walter A.

Journal Boxes
Bemis Car Truck Co.
Brill Co., J. G.

Lamp Guards and Fixtures
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Lamps, Arc and Incandescent (See also Headlights)
Anderson Mfg. Co., A. & J. M.
General Electric Co.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.

Lamps, Signal and Marker
Ohio Brass Co.

Lathe Attachments
Williams & Co., J. H.

Lathes, Car Wheel
Niles-Bement-Pond Co.

Lightning Protection
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.

Line Material (See also Brackets, Insulators, Wires, etc.)
Anderson Mfg. Co., A. & J. M.
Archbold-Brady Co.
Columbia M. W. & M. I. Co.
Drew Electric & Mfg. Co.
Electric Railway Equipment Co.
Electric Service Supplies Co
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.

Loaders, Wagon, Truck or Car
Portable Machinery Co.

Locking Spring Boxes
Wharton, Jr., & Co., Wm.

Locomotives, Electric
Brill Co., The J. G.
General Electric Co.
McGuire-Cummings Mfg. Co.
Westinghouse Elec. & Mfg. Co.

Lubricating Engineers
Galena-Signal Oil Co.

Lubricants, Oil and Grease
Galena-Signal Oil Co.

Machine Tools
Columbia M. W. & M. I. Co.
Niles-Bement-Pond Co.

Machine Work
Columbia M. W. & M. I. Co.

Manganese Steel Castings
Wharton, Jr., & Co., Wm.

Manganese Steel Special Track Work
Wharton, Jr., & Co., Wm.

Meters (See Instruments)
Electric Service Supplies Co.

Mirrors for Motormen
Drew Elec. & Mfg. Co.

Molding Metal
National Metal Molding Co.

Money Changers
Galef, J. L.

Motormen's Seats
Electric Service Supplies Co.
Wood Co., Chas. N.

Motors, Electric
Allis-Chalmers Mfg. Co.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.

Motors and Generators, Sets
General Electric Co.

Motor Truck
Packard Motor Car Co.

Nuts and Bolts
Allis-Chalmers Mfg. Co.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Hubbard & Co.
Lackawanna Steel Co.

Oil Burning Equipment
Schutte & Koerting Co.

Oils (See Lubricants)

Packing
Westinghouse Elec. & Mfg. Co.

Paints and Varnishes for Woodwork
National Ry. Appliance Co.

Paving Blocks
Northern Gravel & Stove Co.

Paving Material
American Brake Shoe & Fdry. Co.

Pickups, Trolley Wire
Electric Service Supplies Co.
Ohio Brass Co.

Pinion Pullers
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
Wood Co., Chas. N.

Pinions (See Gears)

Pins, Case Hardened, Wood and Iron
Bemis Car Truck Co.
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse Traction Brake Co.

Pipe
National Tube Co.

Pipe Fittings
Power Specialty Co.
Standard Steel Works Co.
Westinghouse Traction Brake Co.

Planers (See Machine Tools)

Pliers, Insulated
Electric Service Supplies Co.

Plugs
National Metal Molding Co.

Pneumatic Tools
Chicago Pneumatic Tool Co.
Ingersoll-Rand Co.

Pole Reinforcing
Hubbard & Co.

Poles, Metal Street
Bates Expanded Steel Truss Co.
Electric Railway Equipment Co.
Hubbard & Co.

Pole Sleeves
Drew Elec. & Mfg. Co.

Poles, Ties, Post, Piling and Lumber
Bennett-Field Cross Tie Co.
Duncan Lumber Co.
Page & Hill Co.
Western Electric Co.

Poles, Trolley
Anderson Mfg. Co., A. & J. M
Columbia M. W. & M. I. Co
Electric Service Supplies Co
National Tube Co.
Nuttall Co., R. D.

Poles, Tubular Steel
Electric Railway Equipment Co.
National Tube Co.

Poles and Ties Treated
Bennett-Field Cross Tie Co.
Duncan Lumber Co.
Page & Hill Co.
Western Electric Co.

Power Saving Devices
National Ry. Appliance Co

Pressure Regulators
General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co

Pumps
Allis-Chalmers Mfg. Co.
Schutte & Koerting Co.

Punches, Ticket
Bonney-Vehelage Tool Co.
International Register Co., The
Wood Co., Chas. N.

Purifiers, Feed Water
Scaife & Sons Co., Wm. B

Rails
Foster Co., L. B.
Lackawanna Steel Co.

Rail Grinders (See Grinders)

Rail Joint Plates
Lackawanna Steel Co.

Rails, Relaying
Foster Co., L. B.
Zelnicker, Walter A., Supply Co., Inc.

Rails, Steel
Carnegie Steel Co.

Railway Safety Switches
Westinghouse Elec. & Mfg. Co.

Rattan
Brill Co., The J. G.
Electric Service Supplies Co.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.

Registers and Fttings
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Rooke Automatic Register Co.

Reinforcement, Concrete
American Steel & Wire Co.
Carnegie Steel Co.
Lackawanna Steel Co.

Repair Shop Appliances (See also Coil Banding and Winding Machines)
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

Repair Work (See also Coils)
Cleveland Armature Works
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Replacers, Car
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

Resistance, Grid
Columbia M. W. & M. I. Co.

Resistance, Wire and Tube
General Electric Co.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.

Retrievers, Trolley (See Catchers and Retrievers, Trolley)

Rheostats
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Roofing, Car
Pantasote Co.

Rosettes
National Metal Molding Co.

Sanders, Track
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Ohio Brass Co.
St. Louis Car Co.

Sash Fixtures, Car
Brill Co., The J. G.

Scrapers, Track (See Cleaners and Scrapers, Track)

Collier Service

How the Experience of Collier Service Maintains Faith in Car Card Advertising

Your experience in transportation has taught you how to adjust your service—which is your selling appeal—to the habits of your patrons. Otherwise your investors would have nothing to show for their investment.

Experience is just as vital a factor in advertising, not simply in advertising as a whole but in such a highly specialized field as car cards.

For instance, only the nation-wide, generation-long experience of Collier Service assures the car card advertiser of the highest percentage of messages that will be *read*, APPROVED and FOLLOWED because Collier Service has developed precisely the right kind of appeal that can be put into the few words and the simple picture most practicable on a standard size car card.

It follows that if the user of Collier Service had failed to receive satisfactory results, car card advertising would never have become a *stable* source of electric railway income.

Barron G. Collier
INCORPORATED

Candler Building, New York

WHAT AND WHERE TO BUY

Seats, Car (See also Rattan)
Brill Co., The J. G.
St. Louis Car Co.

Seating Materials
Du Pont Fabrikoid Co.
Pantasote Co.

Second-Hand Equipment
Archer & Baldwin
Cleveland Armature Works
Hyman Michaels Co.
Zelnicker Supply Co., Inc., Walter A.

Shades, Vestibule
Brill Co., The J. G

Shovels
Allis-Chalmers Mfg. Co.
Brill Co., The J. G.
Hubbard & Co.

Signals, Car Starting
Consolidated Car Heating Co.
Electric Service Supplies Co.
National Pneumatic Co., Inc.

Signal Systems, Block
Electric Service Supplies Co.
Nachod Signal Co., Inc.
U. S. Electric Signal Co.
Western Electric Co.
Wood Co., Chas. N.

Signal Systems, Highway Crossing
Nachod Signal Co., Inc.
U. S. Electric Signal Co.

Slack Adjusters (See Brake Adjusters)

Slag
Carnegie Steel Co.

Sleet Wheels and Cutters
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Drew Electric & Mfg. Co.
Electric Railway Equipment Co.
More-Jones Brass & Metal Co.
Nuttall Co., R. D.

Snow-Plows, Sweepers and Brooms
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Consolidated Car Fender Co.
McGuire-Cummings Mfg. Co.

Sockets & Receptacles
National Metal Molding Co.

Solderless Connectors
Frankel Connector Co.

Speed Recorders, Locomotive & Car
Chicago Pneumatic Tool Co.

Spike Drivers, Portable Electric (Screw Spikes)
ChicagoPneumatic Tool Co.

Spikes
American Steel & Wire Co
Lackawanna Steel Co.

Splicing Compounds
Westinghouse Elec. & Mfg. Co.

Splicing Sleeves (See Clamps and Connectors)

Spray Nozzles
Schutte & Koerting Co.

Springs, Car and Truck
American Steel & Wire Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Fort Pitt Spring & Mfg. Co.
Standard Steel Works Co.

Sprinklers, Track and Road
Brill Co., The J. G.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.

Steel Castings
Wharton, Jr., & Co., Wm.

Steps, Car
American Mason Safety Tread Co.

Stokers, Mechanical
Babcock & Wilcox Co.
Westinghouse Elec. & Mfg. Co.

Storage Batteries (See Batteries, Storage)

Strand
Copper Clad Steel Co.
Roebling's Sons Co., J. A.

Structural Steel
Lackawanna Steel Co.

Superheaters
Babcock & Wilcox Co.
Power Specialty Co.

Sweepers, Snow (See Snow Plows, Sweepers and Brooms)

Switch Stands
Ramapo Iron Works

Switches, Track (See Track Special Work)

Switchboard Mats
Western Electric Co.

Switchboxes
Chicago Fuse Mfg. Co.

Switches, Automatic
Western Electric Co.

Switches and Switchboards
Allis-Chalmers Mfg. Co.
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.

Tampers, Tie
Ingersoll-Rand Co.

Tapes and Cloths (See Insulating Cloth, Paper and Tape)

Telephones and Parts
Electric Service Supplies Co.
Western Electric Co.

Testing, Commercial and Electrical
Elec'l Testing Laboratories

Testing Instruments (See Instruments, Electrical Measuring, Testing, etc.)

Thermostats
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Railway Utility Co.
Smith Heater Co., Peter

Ticket Choppers and Destroyers
Electric Service Supplies Co.

Tie Plates
Lackawanna Steel Co.

Ties, Mechanical
Dayton Mechanical Tie Co.

Ties and Tie Rods, Steel
American Bridge Co.
Barbour-Stockwell Co.
Carnegie Steel Co.
International Steel Tie Co.

Ties, Wood Cross (See Poles, Ties, Posts, etc.)

Tongue Switches
Wharton, Jr., & Co., Wm.

Tool Holders
Williams & Co., J. H.

Tool Steel
Carnegie Steel Co.

Tools, Thread Cutting
Chicago Pneumatic Tool Co.
Williams & Co., J. H.

Tools, Track and Miscellaneous
American Steel & Wire Co
Chicago Pneumatic Tool Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Hubbard & Co.
Railway Track-work Co.

Towers and Transmission Structures
American Bridge Co.
Archbold-Brady Co.
Bates Expanded Steel Truss Co.
Westinghouse Elec. & Mfg. Co.

Track Bolts and Spikes
Lackawanna Steel Co.

Track Expansion Joints
Wharton, Jr., & Co., Wm.

Track, Special Work
Barbour-Stockwell Co.
Columbia M. W. & M. I. Co.
Engel & Hevenor
New York Switch & Crossing Co.
Ramapo Iron Works
St. Louis Frog & Switch Co.
Wharton, Jr., & Co., Inc., Wm.

Transfer Tables
American Bridge Co.
Archbold-Brady Co.

Transfers (See Tickets)

Transformers
Allis-Chalmers Mfg. Co.
General Electric Co.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.

Treads, Safety, Stair, Car Step
American Mason Safety Tread Co.

Trolley Bases
Ackley Brake & Supply Corp.
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Nuttall Co., R. D.
Ohio Brass Co.

Trolley Material, Overhead
Flood City Mfg. Co.

Trolley Wire
Anaconda Copper Mining Co.
Bridgeport Brass Co.
Copper Clad Steel Co.

Trolley Bases, Retrieving
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Nuttall Co., R. D.
Ohio Brass Co.

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Wheel Presses (See Machine Tools)

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Putting Pulling Power into the Business Paper

FOR the third time since January an *Electrical World* editor is traveling from New York to California in active co-operation with the National Electric Light Association. Three other *Electrical World* editors have made the trip from the Atlantic to the Pacific in the same period, scouring up and down the states between for facts and figures of essential importance to electrical engineering and commercial interests.

Out of the power plant world a demand, multiplied and insistent, comes for information on oil engines. As a result. a noted authority on Diesel and semi-Diesel engines is added to the editorial staff of *Power.* He is sent out to visit all important installations of these engines throughout the country. Over three months of travel and study will be spent by this *Power* editor solely to gain for *Power* readers a fuller knowledge of oil engines operating performance under all possible service applications and conditions.

A McGRAW-HILL man representing *Engineering & Mining Journal,* after having been forced out of Mexico by warring factions, has again plunged into that turbulent country to learn and report actual conditions affecting mining and oil well operations and prospects and equipment opportunities.

An editor of *Ingenieria Internacional* comes back from a long trip through the countries of South America bringing much valuable data on trade conditions, engineering and industrial development, and equipment requirements.

American Machinist recently sent one of its executives on a tour of Europe to study the metal-working industries abroad for the benefit of similar industries and machine-tool manufacturers at home.

An editor of *Engineering News-Record* also has just returned from Europe where he has been investigating engineering practice and equipment usage and needs in the construction field.

General departure from rule-of-thumb methods is an urgent need of the chemically controlled industries. To this end *Chemical & Metallurgical Engineering* has made an exhaustive investigation on which is founded one of the most significant and important issues of any publication in the engineering and industrial press—the September 8th "Convention" issue of *Chemical & Metallurgical Engineering.*

Electrification of steam railroads is a question pregnant with transportation improvement possibilities in this country. So an *Electric Railway Journal* editor recently made an extended trip over the system of the Chicago, Milwaukee & St. Paul R.R. to study this famous achievement in railroad development. Returning east this editor made a sweeping tour of Canada, getting data vitally interesting to American electric railway men and builders of electric railway material on today's methods, equipment, plans and outlook of the foremost Canadian electric railways.

The extraordinary success of *Electrical Merchandising* since its inauguration in 1907 is largely due to the indefatigable field work of the editors. These editors comb the continent with their journeys. They are constantly in personal contact with the electrical dealers, jobbers and contractors. They meet them at their conventions, clubs, clambakes, summer camps, offices, stores, warehouses and homes. They are keeping in touch with movements and materials and markets and methods and men—helping these men individually and through their organization.

Industrial, agricultural and commercial development of the West beyond the Rockies depends in large measure on the development of electricity from water power. To promote the industrial development of these great States with their specialized problem, McGRAW-HILL service to the electrical field was expanded in September, 1919, by the purchase of the *Journal of Electricity.* The acquisition of this publication demonstrates that McGRAW-HILL service, when conditions require, is intensive, as well as comprehensive.

As an editor of *Coal Age* recently wrote, "Read your *Coal Age* closely, and you will see that no stone is being left unturned to make *Coal Age* a mirror of the industry, to make the achievements and experience of some enterprising individual somewhere the pivotal point for an advance of the entire craft."

THIS is the policy that governs ALL McGRAW-HILL publications. It picks the ablest men as editors. It sends them out into the fields served by those publications. It bids them seek the problems of those fields. And through their publications these editors lead and co-ordinate the search for the answer to those problems.

That is the kind of service that puts pulling power into a business publication.

That is why McGRAW-HILL publications are dominant in their fields.

That is why they are read—with care and respect—by the biggest men in those fields.

And that is why they exert the influence on those men that makes advertising in McGRAW-HILL publications productive.

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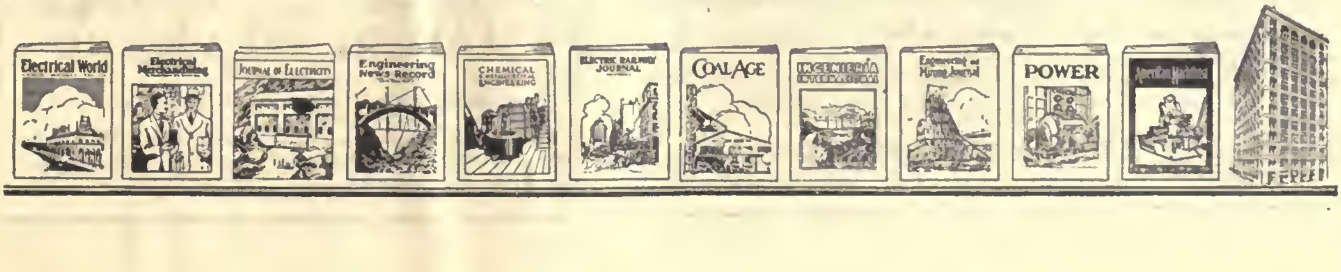

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is one of the winter problems that you must settle without delay. We can show you how to take care of both, with one equipment. Now is the time to get your cars ready for next winter. Write for details.

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1725 Mt. Elliott Ave., Detroit, Mich.

THE SEARCHLIGHT SECTION

will locate the
Man you want
Position you want
Equipment you want

Are you using the Searchlight ?

59

"Why did you pass us over and take a man from the outside?"

TWO junior executives and the Vice President of a Company which is the leader in its field, were seated at luncheon in a New York hotel.

They had invited the Vice President to lunch; they had a very serious question to ask him, and they went to it without loss of time.

"You know our records," one of them said, "and the length of our service with the Company. Each of us supposed that he was in direct line for promotion. Yet when the managership of the office at X became vacant last month you chose an outsider.

"Why did you pass us over and take a man from outside?"

The Vice President refused to answer the question then. "If each of you will come separately to my office this afternoon," he said, "I will tell you."

"What would you have done in my place?"

THAT afternoon each of the two young men sought the Vice President privately. And to each he put the same question.

"Ours is a technical organization," he said, "And you are a technically trained man. You have no experience beyond one single department. The manager of one of our branch offices must meet all kinds of executive problems. Now I ask you, what would you have done in my place? Would you appoint a man who had technical training but no grasp of business fundamentals? Or would you appoint an executive, and let him rely on his assistants for technical advice?"

Each of the young men went away very thoughtful. What happened to one of them we do not know; the other one

Enrolled with the Alexander Hamilton Institute

"I WANT to tell you why I have taken this step," he said at the time of his enrolment; and then he went on to tell the story just as it has been told here.

"I am still under thirty," he concluded. "It doesn't hurt me to be passed over *once* at my age. But suppose I go on knowing only one department of business, and they pass me over again and again. Where will I be at forty? Or at fifty? When the next chance comes I intend to have a training that they simply cannot ignore."

Thousands of men who will not be passed over

THE Alexander Hamilton Institute was founded by a group of business leaders who recognized that modern business was training specialists but was too often failing to develop executives.

"There are certain fundamentals that underlie all business," these men said. "An executive must know something of sales and merchandising; of costs and accounting; of factory and office organization; of advertising and corporation finance. He need not be a specialist in any one of these, but he must know enough to employ and intelligently direct specialists."

On that broad and sure foundation the Institute was founded; and the proof of its training is the thousands of men it has trained. They are marked men in any organization, men not easily passed over. For they have the asset for which Business pays its highest rewards—the capacity for executive thinking, and executive decision.

You are paying whether you profit or not

THE man who enrols for business training pays a little price in time and money; but what price does the man pay who fails to enrol?

Tomorrow an opportunity may pass you by because you have not the training or self-confidence to reach out and grasp it. Next week an executive casting about for a man may say of you: "I like him; and he knows the work of his department well. But he does not know Business as a whole."

And so success may be delayed for you for a year, or five years or ten. Only you know what a year of your life is worth. But surely it is worth an hour of investigation at least.

"Forging Ahead in Business"

INVESTIGATION is very easy. The full facts about the Modern Business Course and Service are published in a 116-page book entitled "Forging Ahead in Business." It answers your questions in terms of the experience of men whose problem was similar to yours. The hour you spend with it may prove to be the most valuable hour in your business life. There is a copy without obligation for every thoughtful man; send for your copy today.

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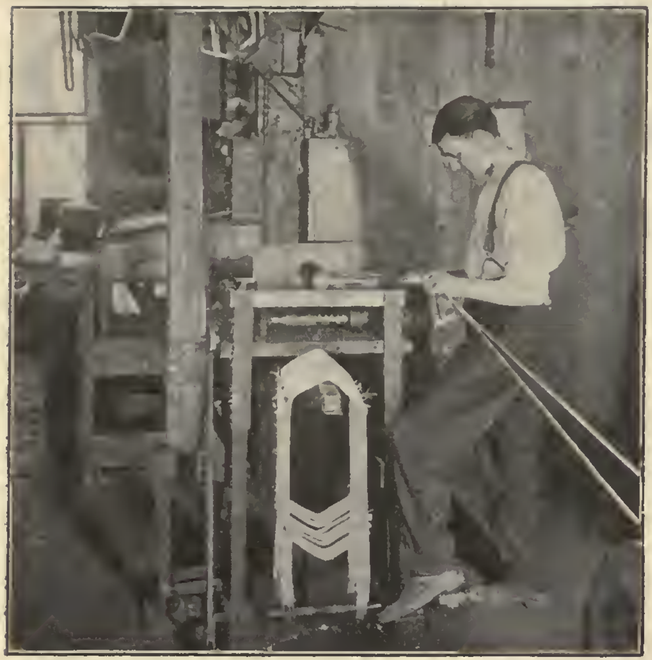

Columbia Coils Are Made Just Right

Columbia-Made Brush-holders are available for any motor

How Can Motor Maintenance in Winter Be Reduced?

As a result of the severe weather conditions in the New England section during the last winter many railway officials have been wondering if we have not over-rated the reliability of our railway motors. Reliability has always been considered as the first and most necessary requirement for electric railway service, and to maintain this motors must withstand the most severe service and abuse under the extreme conditions of winter service.

In order to obtain far-reaching results it will be necessary also for the various railway companies to improve their methods of rewinding armatures and field coils and taking care of other repairs, for obviously the motors which are now in operation will be continued in service for several years and improvements in these motors cannot be made by the manufacturers. Electric railways which are not already dipping and baking their railway windings should consider this most carefully, for, it is evident that only through a more thorough waterproofing of the motors can improvements and beneficial results be obtained under these extreme weather conditions.

Columbia Specialties will answer ←this Question

There is the question—asked at the end of last year's severe winter. And above you see illustrated *the answer*—

Columbia Coils, specially designed and wound for rewinding old armatures, and

Columbia Brush Holders, used by some of the biggest electric railways in the United States—the brush holders that sell themselves by a trial.
The time to begin to reduce armature mortalities this year is NOW—write for details.

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- Armature buggies and stands
- Babbitting molds
- Banding and heading machines
- Car hoists
- Car replacers
- Coil taping machines for armature heads
- Coil winding machines
- Pinion pullers
- Pit jacks
- Signal or target switches
- Tension stands

CAR EQUIPMENT

- Armature and axle bearings
- Armature and field coils
- Bearings (axle and armature)
- Brush-holders and brush-holder springs
- Brake, door and other handles
- Brake Forgings, rigging, etc.
- Car trimmings
- Commutators
- Controller handles
- Forgings of all kinds
- Gear cases (steel or malleable iron)
- Grid resisters
- Third-rail shoe beams and accessories
- Trolley poles (steel) and wheels

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2. **On Lightly Traveled Lines where an improved service with short headways will stimulate car riding.**
3. **On Suburban Lines under a shorter headway schedule than maintained by other types of cars.**
4. **On Minimum Service Lines where the franchise demands some service.**
5. **In Owl Service, where more frequent service will improve public relations.**

3—On Suburban Lines

The development of suburban districts depends considerably upon available transportation. The more frequent service possible with Birney Safety Cars on account of their economical operation will greatly assist in the development of the less populated suburban districts.

The more frequent Birney Safety Car Service will also attract passengers lost by the Electric Railway to other transportation companies. Service with Safety is what the public wants.

Memo

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OVER

2800

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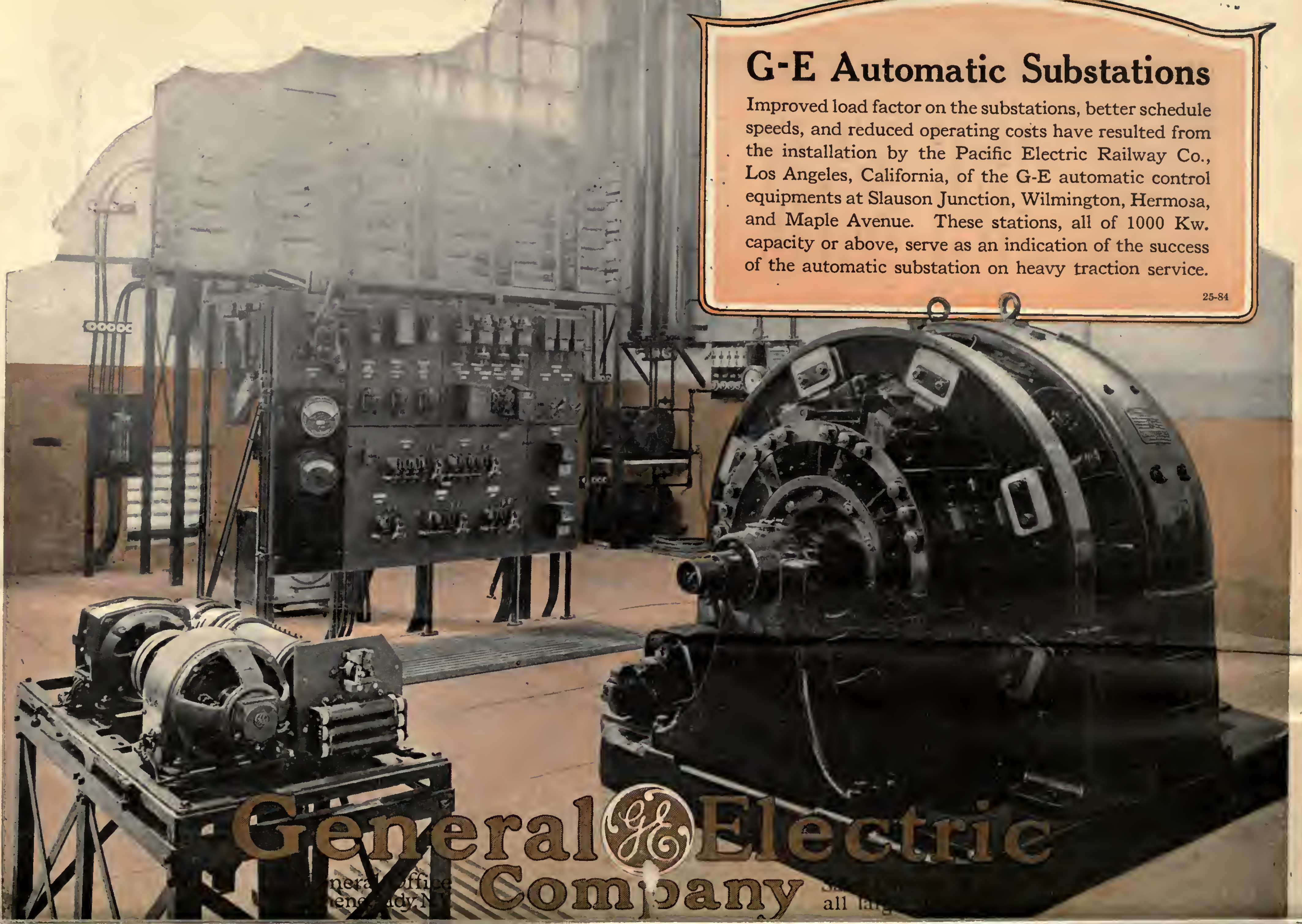

G-E Automatic Substations

Improved load factor on the substations, better schedule speeds, and reduced operating costs have resulted from the installation by the Pacific Electric Railway Co., Los Angeles, California, of the G-E automatic control equipments at Slauson Junction, Wilmington, Hermosa, and Maple Avenue. These stations, all of 1000 Kw. capacity or above, serve as an indication of the success of the automatic substation on heavy traction service.

25-84

General Electric Company

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ELECTRIC RAILWAY JOURNAL

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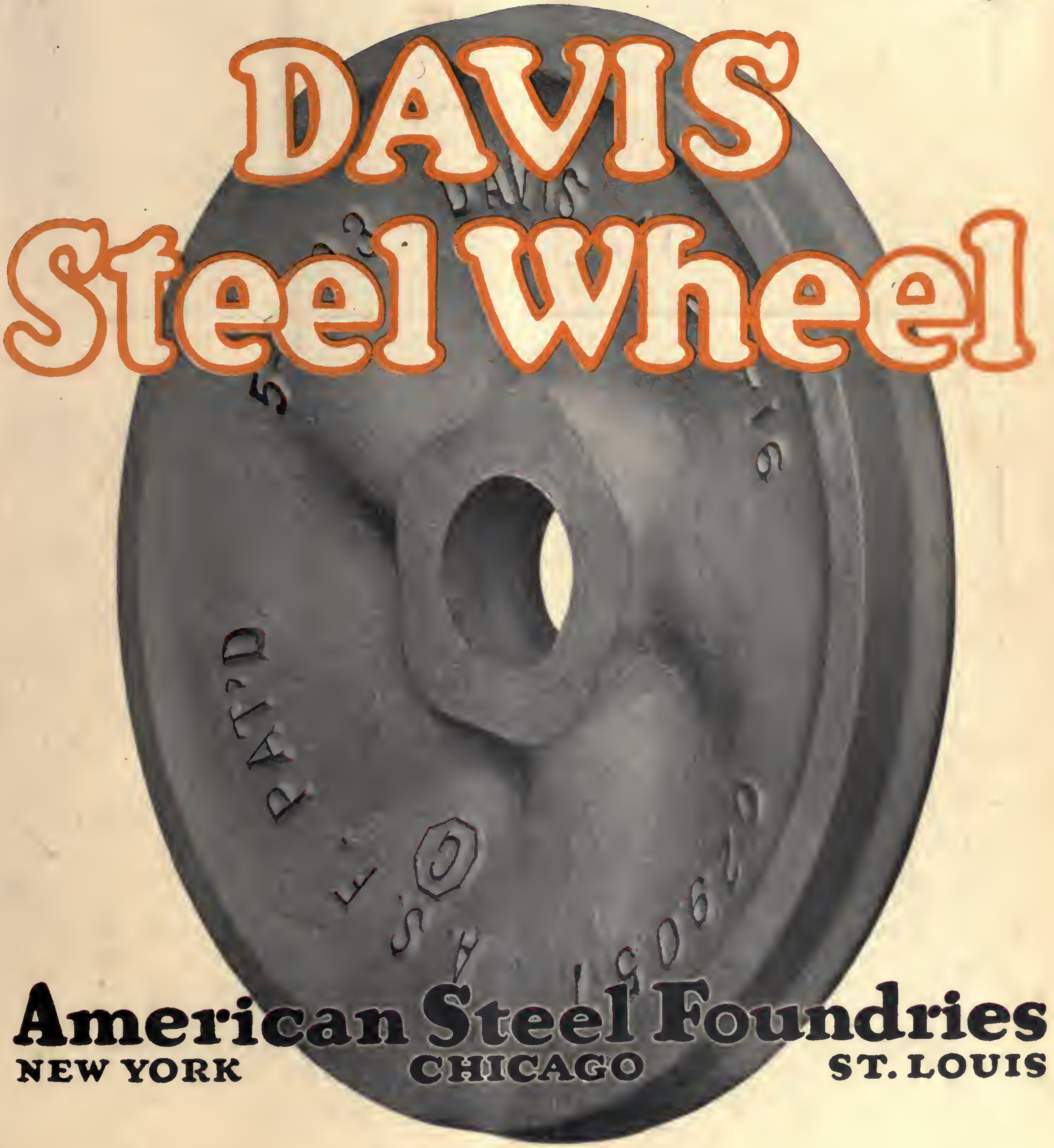

"Finance"

American Electric Railway Association, Chicago, February 10th

"Joe" said the Vice-President, "I want all Department Managers to attend the A. E. R. A. Meeting at Chicago on February 10th. Most of our Directors, as well as the heads of our Financial and Legal Departments, are going to attend. It is in my opinion the most important meeting the Association has ever called.

The principal papers and discussions will deal with our foremost problem 'Finance.' The more our own people, as well as the public understand the economics of this phase of our business, the easier it will be to solve it. I am going to write several of our local bankers and newspaper editors to go along with me as our guests so they may get a first hand grasp of the situation. I am satisfied that a great deal of our financial requirements can be cared for locally and greater stability for our securities would result if the people of our own communities were the investors."

"That is very interesting, Boss," said Joe. "None of us fellows ever gave much thought to the financial end of our business in the past, but there is no reason why all of us should not be just as interested in the sale and stability of our securities, as we are in any other part of it, especially when we know that without adequate financial support we cannot get anywhere. Another very interesting thing about Chicago, Boss, is that it will give all of us a chance to see the wonderful Chicago, North Shore & Milwaukee high-class interurban passenger and freight-haulage line, equipped almost exclusively with Westinghouse HL Control and No. 557-140 hp. motors. This road was a dead one for years until a progressive management took hold of it, who have built up the passenger and freight business in a simply wonderful manner. They recently added two Baldwin-Westinghouse Locomotives to help handle freight on the elevated division."

Westinghouse Electric & Manufacturing Co.

Sales Offices in All Large American Cities East Pittsburgh, Pa.

Vol. 57, No. 5 New York, January 29, 1921 *Pages* 207-250

Electric Railway Journal

Henry W. Blake and Harold V. Bozell, Editors Henry H. Norris, Managing-Editor

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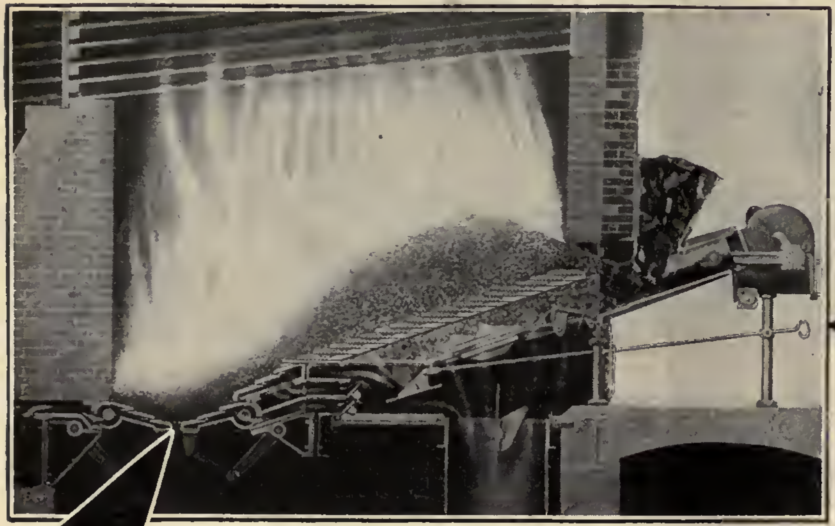
100%



"If you consider your coal at its cash value, the unburned coal in the ash is like small change."

—Industrial Power
Sept. 1920

The "small change" of the Boiler Room is the unburned fuel that passes over the dump grate.

100% Air Distribution prevents the loss of this "small change."

100% Air Distribution means that the Westinghouse Underfeed Stoker is a stoker through and through—that every square foot of grate surface is active grate surface from front wall to bridge wall.

100% Air Distribution means that the DUMP GRATE is not dump grate ONLY—it is ACTIVE GRATE SURFACE to be used when needed. It is supplied with air so that every particle of unburned fuel reaching it may be efficiently consumed.

No "small change" passes over the dump grate of the Westinghouse Underfeed Stoker.

Ask for Leaflet 3985 describing the Westinghouse System of Air Distribution.

Westinghouse Electric & Manufacturing Company
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WESTINGHOUSE ELECTRIC

Westinghouse

UNDERFEED OVERFEED AND CHAIN GRATE STOKERS

The Variable-Load Brake
—the Brake which automatically weighs its passengers and likewise adjusts Braking Power to make stopping distance the same with loaded, partly loaded and empty trains

8-car train on the Municipal Railway, New York City, fitted with Variable-Load Brakes.

Meeting the Specifications of the "Municipal"

The development of the Variable Load Brake for the New York Municipal Railway helped to solve extremely important and complicated problems of headway.

When the Municipal officials found it imperative to increase the CARRYING CAPACITY of their lines by operating longer trains on shorter headway, they determined they would require a brake capable of decelerating a 10-car train at the rate of 2½ miles per hour per second for service stops, and 3½ miles per hour per second in emergency, providing a short, smooth and *absolutely uniform stop* at all times regardless of the weight of the load.

These stringent specifications were met by Westinghouse engineers with the Variable Load Equipment which was evolved for the express purpose of covering the special requirements of the "Municipal," and which has proved eminently satisfactory since its introduction in 1915.

Westinghouse Traction Brake Company

General Offices: Pittsburgh, Pa.
Works: Wilmerding, Pa.

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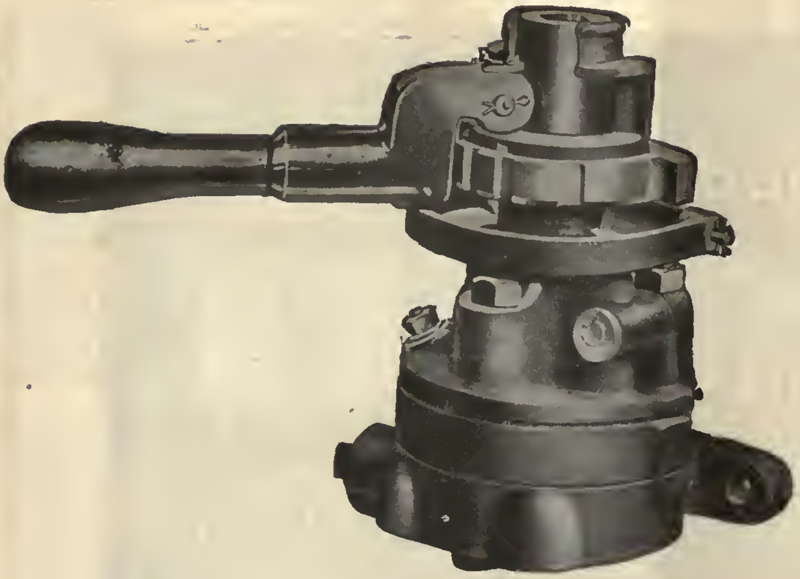


AIR BRAKE
and
SAFETY CAR
CONTROL
EQUIPMENT

"I think your city would make no mistake in adopting it."

He was speaking of Safety Cars

"They have been in operation here for a comparatively short time, but it seems as if it would be in a fair way of solving our very serious transportation problems and I think your city would make no mistake in adopting it, especially where streets are narrow and congested."

Which proves that Safety Cars are not especially designed for light traffic in sparsely populated districts but are capable of improving service under *all* traffic conditions.

But remember—it is a Safety Car only when equipped with automatic laborless apparatus, so interlocked that, regardless of the illness or distraction of the operator, the power will be cut off instantaneously, the air brakes and sander apply immediately thereafter and the doors unlock for safe and easy exit. Furthermore, it is a Safety Car only when the doors must be closed before the car can start, and when the air brake must be applied before the doors are opened and the step lowered in bringing the car to a service stop.

SAFETY CAR DEVICES CO.

Main Office—Boatmen's Bank Bldg., ST. LOUIS, MO.

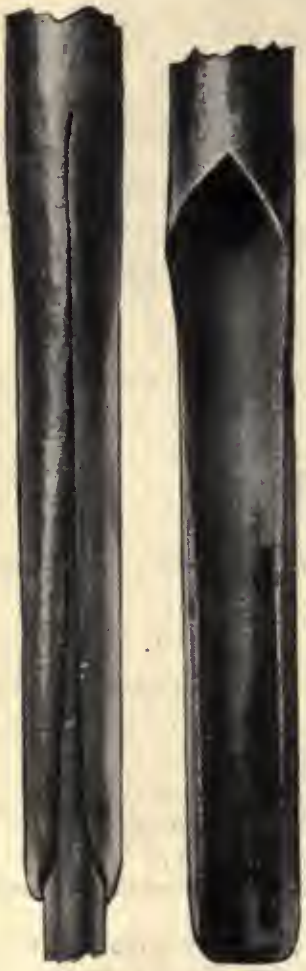
CHICAGO Railway Exchange Bldg. WASHINGTON, D. C. Munsey, Bldg. NEW YORK City Investment Bldg. SAN FRANCISCO Southern Pacific Bldg. PITTSBURGH Westinghouse Bldg.

CANADA—Canadian Westinghouse Co., Ltd., Hamilton, Ont.

O-B Type D Splicer 20 inches long—patented

O-B Type D Splicing Ear 22 inches long—patented

If You Have High Strength Trolley You Need O-B Type D Splicer



O-B lip design is patented. Open, the lips resemble a split tube. When they are pounded down they fit the wire accurately and make a clean smooth underrun.

High strength wire required a high strength splicer—which is the same as saying O-B Type D. Even a pull which breaks Phono-Electric or steel trolley does not loosen the hold of O-B Type D Splicer. That is why it is largely used on electrified steam roads and for other heavy and important service.

It is easy to install the O-B Type D Splicer. The wire enters through a long, almost straight passage — just a slight kink and wire passes through easily.

The straightaway entrance also prevents weakening of the trolley wire at a vital point. There is less wear on the trolley when O-B Type D holds the wire.

One of the several O-B Splicers will suit you. There is a complete line—all with the patented lips. Look in the general catalog.

Ohio Brass Company, Mansfield, Ohio

New York
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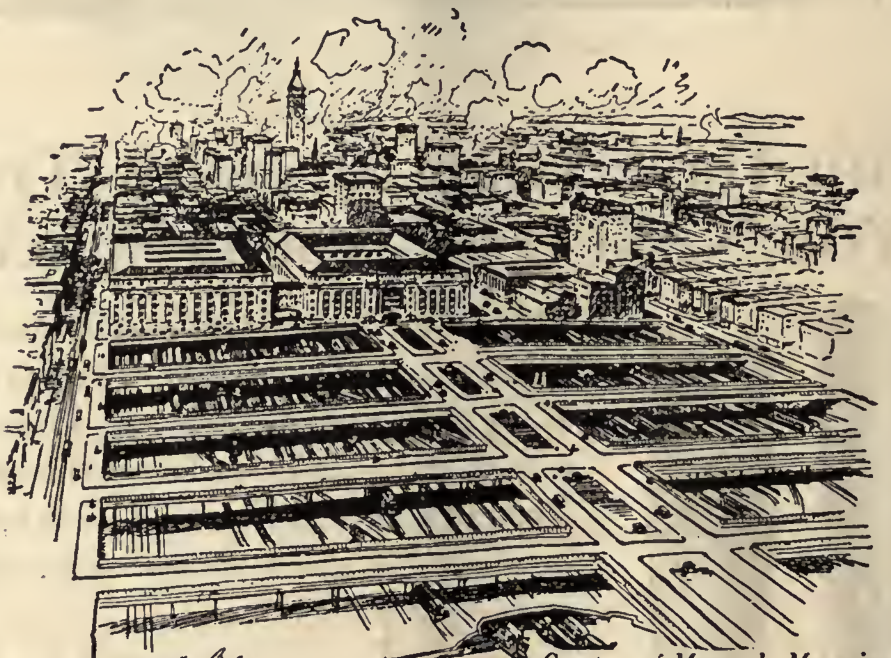
Manufactures: Rail Bonds, Trolley Materials, High Tension Porcelain Insulators, Third Rail Insulators, Electric Car Equipment.

HABIRSHAW

"Proven by the test of time"

Insulated Wire & Cable



Courtesy of Munsey's Magazine

Reliability

RELIABILITY and continuity of service are the great aims of railroad operation.

Habirshaw wire is reliable.

Habirshaw wire has behind it almost thirty-five years of manufacturing experience backed by an up-to-date organization of manufacturing specialists, scientific men and research laboratories.

Habirshaw manufactures all forms of insulated wires and cables used for cars, signal systems, buildings and electric operation.

Habirshaw Wire Manufactured by
Habirshaw Electric Cable Co.
Incorporated
Yonkers, New York

Habirshaw Wire Distributed by
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Incorporated
Offices in All Principal Cities

Paper Insulated Cable
Round Conductor Cables
Sector Cables

Varnished Cambric Insulated Cables
Armored Cables

Rubber Insulated Cables
Code (Black Core)
Intermediate (Red Core)
30% Hevea R.S.A. Standard

INTERNATIONAL

STEEL TWIN TIES

STEEL CROSSING FOUNDATIONS

The International S

General Sales Offic

Cleveland

This catalogue contains data you should have in planning for the track you will build this year.

It shows how some of the leading track builders are obtaining permanent track at reasonable cost and why this result is produced with STEEL TWIN TIES.

Have A Plan to Save Back of the Track

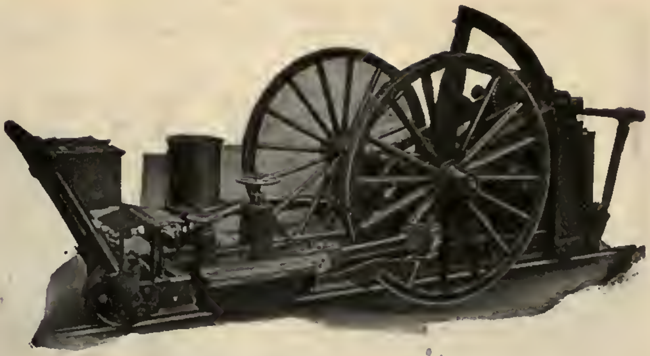
THE surest method of economizing on paved street track construction is to have a definite detailed plan to save, before you start.

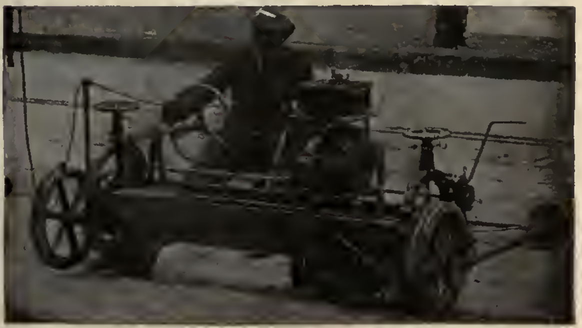
STEEL TWIN TIE construction is a plan to save. It offers a method of saving concrete; of saving grading; of eliminating the handling of one hundred and twelve tons of tie material per mile; of saving thirty percent of the cost of fastening rail to ties. In short, it is a plan to save.

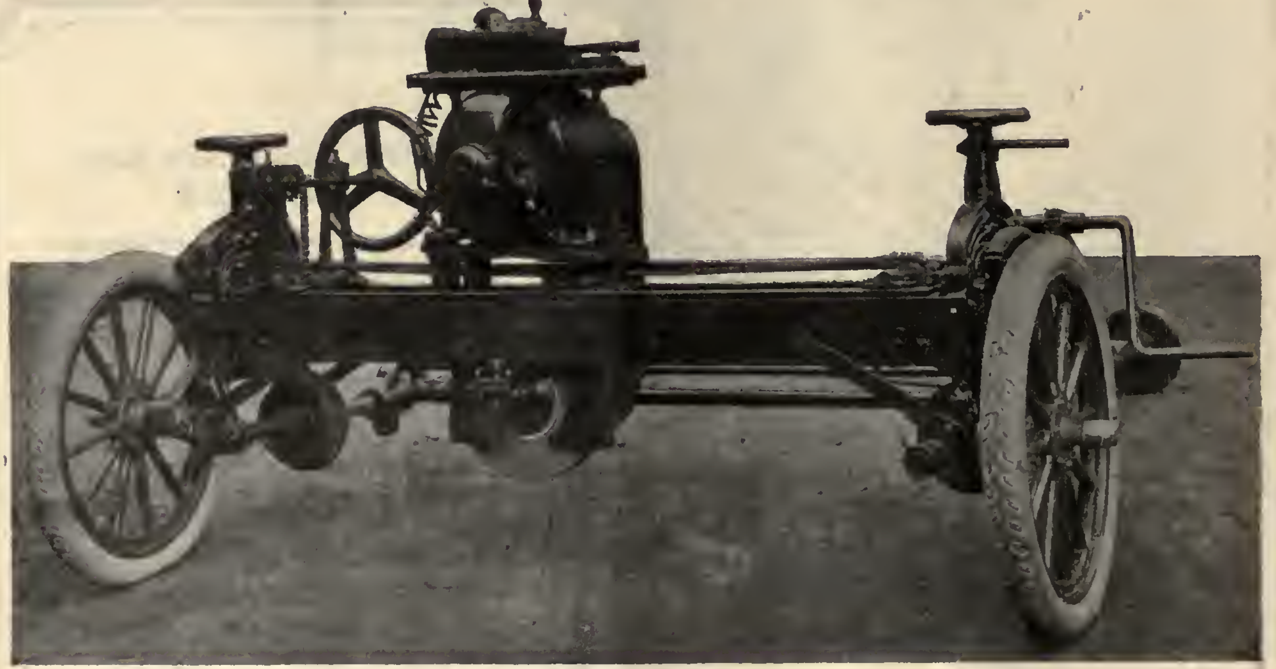
When you consider track construction, a good plan for saving includes STEEL TWIN TIES. Write today for prices at your delivery point.

THE INTERNATIONAL STEEL TIE CO.
CLEVELAND, O.

Here is the Equipment—IF you want to remove Track Corrugations or the surplus metal remaining after a weld—*and to do it well and economically*


Reciprocating Track Grinder


Atlas Rail Grinder


Universal Rotary Track Grinder

RAILWAY TRACK-WORK COMPANY

3132-48 East Thompson St., Philadelphia

Exclusive Agents—

ATLAS RAILWAY SUPPLY CO.,
Chicago, Ill.

ELECTRICAL ENGINEERING & MANUFACTURING CO.,
Pittsburgh, Pa.

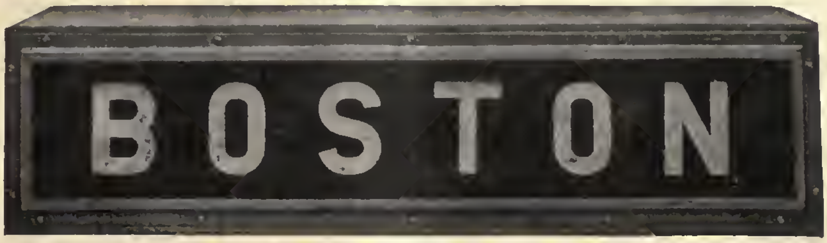
Exclusive Agents—

CHAS. N. WOOD CO.,
Boston, Mass.

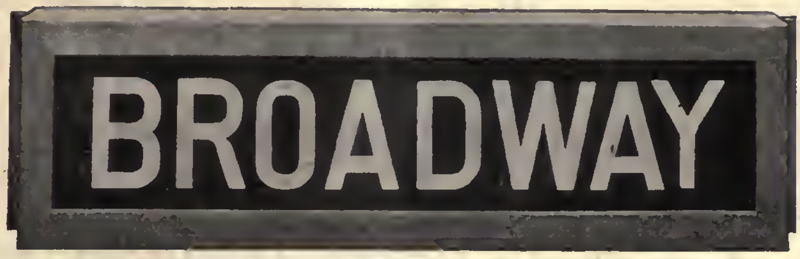
HITCHCOCK, LLOYD & CO., Inc.,
77A Queen Victoria St., E. C.,
London, England.

Advertise Your Service

The Illuminated Car Sign is your best medium



Typical Keystone Type



Typical Hunter Type

Illuminated Car Signs are, in fact, the first line of contact with your riding public. They tend to induce people to ride. They advertise your service. They serve you day and night.

They make easy the re-routing of cars and the shifting of them from one barn to another.

They are complete in themselves. Parts are interchangeable. Uniform tension on Curtains. Curtains and mechanism removable. Curtains interchangeable in types of equal length. No tools necessary to change curtain. Easily cleaned.

Write for complete data.

ELECTRIC SERVICE SUPPLIES CO.

Manufacturer of Railway Material and Electrical Supplies

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17th and Cambria Sts.

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50 Church Street

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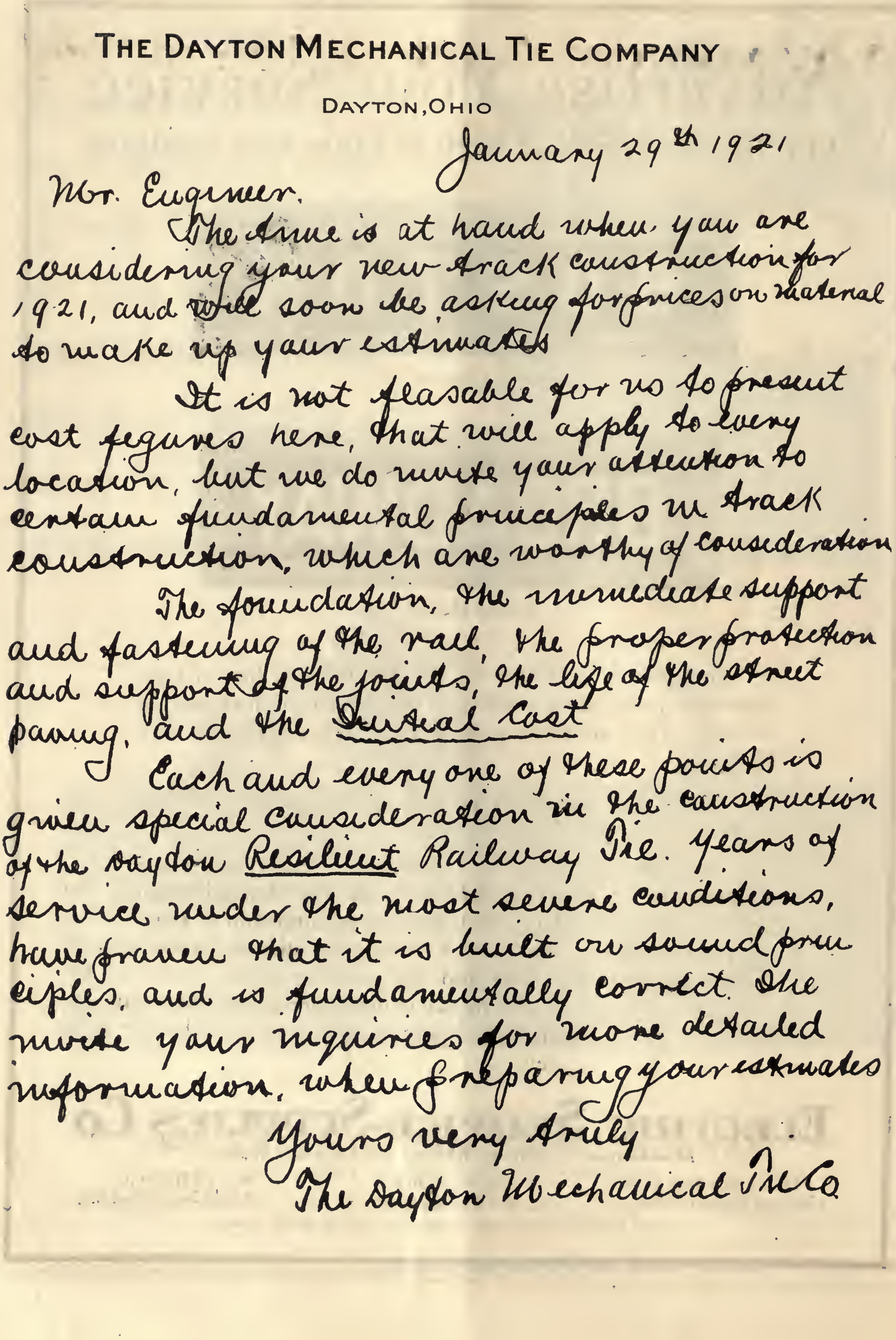
Monadnock Building

Canadian Distributors: Lyman Tube & Supply Co., Montreal, Toronto, Winnipeg



THE DAYTON MECHANICAL TIE COMPANY

DAYTON, OHIO

January 29th 1921

Mr. Engineer.

The time is at hand when you are considering your new track construction for 1921, and will soon be asking for prices on material to make up your estimates

It is not feasable for us to present cost figures here, that will apply to every location, but we do invite your attention to certain fundamental principles in track construction, which are worthy of consideration

The foundation, the immediate support and fastening of the rail, the proper protection and support of the joints, the life of the street paving, and the Initial Cost

Each and every one of these points is given special consideration in the construction of the Dayton Resilient Railway Tie. Years of service under the most severe conditions, have proven that it is built on sound principles, and is fundamentally correct. We invite your inquiries for more detailed information, when preparing your estimates

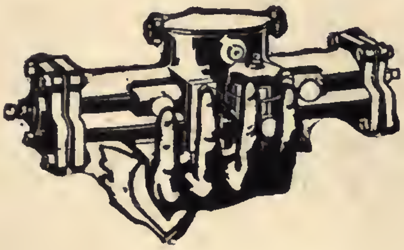
Yours very truly

The Dayton Mechanical Tie Co.

Why you don't get all the money all the time

Think of what goes on at the rear of your cars every rush-hour period!

Standardize! *Pneumatize!*



Passengers piling on pell-mell tendering cash, bills or nothing at all — but all striving to get past the conductor.

Conductor seizes a transfer here, makes change for a greenback there, keeps one eye on the exit aisle, another eye on the entrance step and a third eye if he had it—on the farebox. Hands busy making change and handling transfers, but somehow, someway he's expected to close the doors and pull both the signal and the fare "ding-dings," too.

Can he do it all by hand? Not always, we'll say! Can you help him do it always for the benefit of your treasury and your popularity?

Yes! Add National Pneumatic Door and Step Control to permit his closing those doors with a move of the elbow; and add Motorman's Signal Lights and Interlocking Safety Door Control so that he can concentrate all his "ding-dinging" on the register of money taken in by him to be delivered up to you!

National Pneumatic Company, Inc.

50 Church Street, New York **Edison Bldg., Chicago**

Works: Rahway, N. J.

Manufactured in Canada by
Dominion Wheel & Foundries, Ltd., Toronto, Ont.

Is 3% increase in gross revenue worth getting?

Take your present gross revenue as a basis for figuring. Add to that an additional 3%. The additional amount represents a return on a pretty fair sized investment, doesn't it?

Well, what we're getting at is this. More than two hundred progressive Electric Railways are actually increasing their gross revenue all the way from 3 to 10% by means of a comparatively small investment in Johnson Fare Boxes.

Taking the minimum increase of 3% for the sake of being ultra-conservative, it doesn't require an expert accountant to figure out the profit producing possibilities of such an investment. But 3% is the *minimum.* 10% is not at all unusual.

There you have the story of the Johnson Fare Boxes in a nutshell. *They increase gross revenue 3 to* 10%. They pay for themselves within two or three months and require but an average of two dollars a year for maintenance.

If there is any other single piece of equipment on the market that will do as much for your property we'd like to know about it. We would also appreciate the opportunity of giving you some interesting facts and figures on Johnson Fare Boxes. Write today and our Engineering Department will be placed at your service.

JOHNSON FARE BOX COMPANY
Ravenswood, Chicago, Ill.

SERVICE WITH SAFETY

In Three Car

Two Car

And Safety Car

Operation Is Guaranteed by

Motormen Like Them

because they are so big and reliable and can be seen in plenty of time to bring a car to a stop—No fatal accidents on sharp curves or at switches—no side swiping. Nothing but real front and rear protection at all times.

United States Electric Signal Company
West Newton, Mass.

U. S. Electric Signals

Rail Welding and Bonding Company

Formerly The Lincoln Bonding Co.

RWB

Cleveland, Ohio.

Fish Plate Welding

The Lincoln Carbon Arc Process using the RWB Dynamotor makes a welded joint for new and old track which costs less and lasts as long as the rails themselves.

USE
The
RWB
Dynamotor
for
All
Track
and
Shop
Welding

Rail Bonding

Lincoln Bonds are installed with the RWB Dynamotor in approximately one minute actual welding time. This gives the bonding crew an opportunity to put on bonds quickly, and with unsurpassed permanence.

The World's best Lubricants

"Good as Galena"

When the oil salesman declares his product is "As good as Galena"—a statement that is often made when the lubrication contract is being considered—just bear in mind these facts:

When an Electric Car Oil can deliver, pint for pint, or gallon for gallon, as great a number of car miles—

When an Electric Car Oil can produce a clinging, protective film that keeps the journal cool and smooth—

When an Electric Car Oil can show in actual service its ability to prevent that expensive evil, the "hot box"—

Then, and then only, may it justify its claim to be "as good as *Galena Electric Car Oil.*"

These are the simple, every-day tests of service that show whether car oils possess the characteristic stamina of *quality*—tests that do their own talking.

Of the hundreds of electric railways in the United States, the large majority use Galena Electric Car Oil, for the reason that no other oil has been found able to deliver such efficient and economical lubrication and also because no other oil company is equipped to render such valuable helps in attaining safe and satisfactory operation, as is offered through the medium of Galena Service.

Galena Quality Is our Bond
and Your Security!

TRIGRAM G S O C TRADE MARK

THE GALENA-SIGNAL OIL CO.
NEW YORK FRANKLIN, PA. CHICAGO
Offices in all principal American Cities
LONDON BUENOS AIRES PARIS

GALENA SERVICE

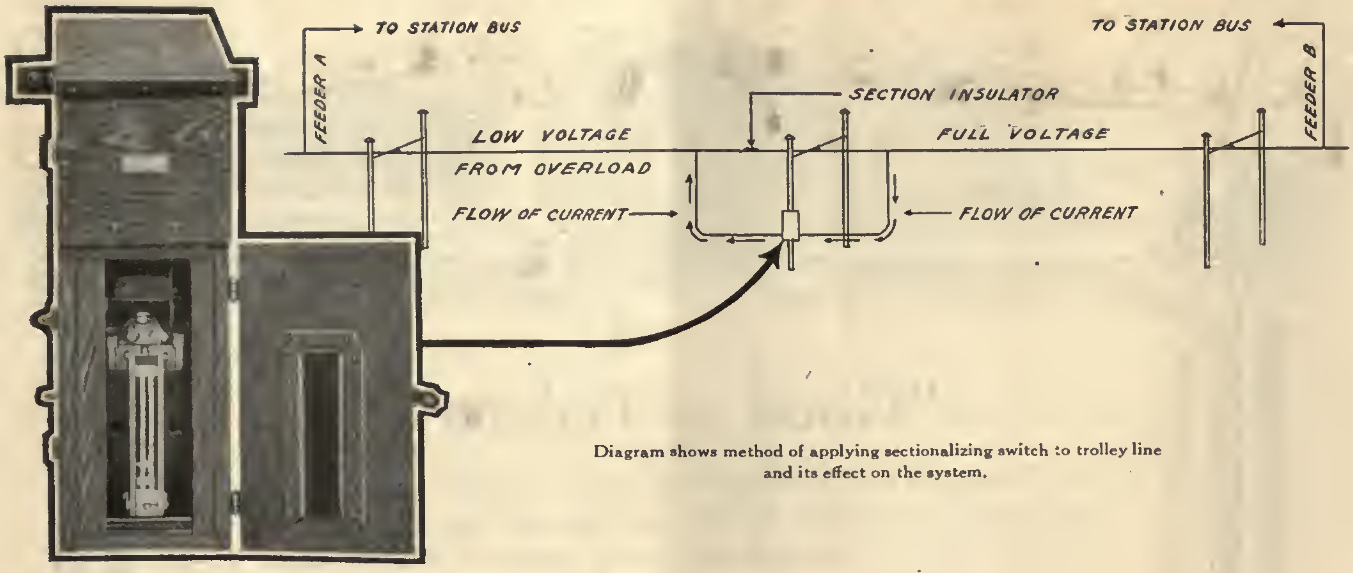


Diagram shows method of applying sectionalizing switch to trolley line and its effect on the system.

The G-E Sectionalizing Switch Saves Copper

By putting all sections of a trolley line in multiple, but affording protection against short circuits or other overloads, the G-E SW-6 switch saves feeder copper either by reducing the number of feeders needed or by reducing the size required.

The sectionalizing switch ties all sections together by bridging the insulators, but, should an overload come on any one section it cuts out that section until normal conditions are restored.

The G-E switch is accurately calibrated and trips positively at the load for which it is set, a newly designed relay giving maximum sensitiveness. The contactor is equipped with barriers and a chute for dividing the arc which accelerates its interruption. The outside dimensions of the SW-6 make it convenient for attaching to trolley poles—2 ft. 11½ inches high, 11 1/16 inches wide and 21¾ inches deep.

Why not investigate these SW-6 switches?
They may save putting on that extra feeder.

General Electric Company

General Office
Schenectady, N.Y.

Sales Offices in
all large cities

40-110

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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Volume 57 New York, Saturday, January 29, 1921 *Number* 5

Chicago Conference Will Teach Several Important Lessons

A READING of the announced program of the association's annual mid-year conference will bring vividly to the minds of electric railway executives some of the difficulties which they have confronted in the past few years in trying to keep up the supply of ready money with which to meet current obligations. President Gadsden's personal letter urging executives to attend this conference has elicited many replies which show the vital interest that is taken in this all important subject at the present time.

While the financial condition of the industry is somewhat improved over that existing a year ago, it is nevertheless far from satisfactory. Even now the number of companies in the hands of receivers is larger than at any previous time in the history of the industry. It seems incredible that ninety-one companies, involving 11.2 per cent of the electric railway mileage and $819,429,294 of securities, in such an essential industry as this are unable to meet fixed charges. These are the facts, however, and they form one basis for the expectation that the lessons to be learned by attendance at Chicago will prove materially helpful in pointing out past pitfalls that are to be avoided in the future.

Reasons for the Automatic Substation's Growing Popularity

PRACTICING economy has been the favorite indoor sport of electric railway officials since the day when the obsolescence of the nickel fare came to be recognized. Every department of the industry has been diligently searched for the purpose of locating and checking waste and inefficiency. In this connection probably no single development of recent years has been more promising than the application of automatic control to electric railway substations. The history of this development has been traced in numerous articles appearing in this paper during the past few years, and it was brought up to date in the table of recent installations and orders which appeared in the issue of Jan. 22.

The "automatic" has attracted the attention of managers primarily because it promises saving in labor costs, which are reduced to those of inspection and maintenance. But there are numerous other items which are almost equally attractive. Substantial savings in transmission line copper are rendered available, and better voltage distribution follows naturally.

The substantial number of new automatic installations is a tribute to the work of the engineers, who have had to overcome many difficulties in bringing about its present status. The showing is remarkable in the light of the "hard-up" condition of electric railways. In spite of the prevailing tendency to curtail outlay, however, the railways have found means to purchase this money saver on a reasonably large scale, partly because it can be shown in general to have a capacity to finance itself very promptly. It is extremely unfortunate that on every property this money-saving capacity cannot be demonstrated.

Of course the automatic substation has a well-defined field, and it cannot be expected to furnish the solution of all distribution difficulties, many of which may have been the result of faulty design. It is, however, no longer an experiment. It has made good or, obviously, its adoption would have been neither so rapid nor so widespread.

Business Men Vote Unanimously for the Electric Railway

EVERY question put by the United States Chamber of Commerce in its Referendum No. 33 has been decided overwhelmingly in favor of the electric railway. This vote was cast during December by the active business men in the various communities throughout the country. They have no interest in electric railway affairs except as they consider the electric railway as a factor in the prosperity and business life of the community. In this vote the electric railway privately owned and operated was judged upon its performance as compared to the jitney bus and what might be expected from the municipal railway. The issue was well defined, and the jury was clearly representative of the best commercial thought of the country. It was the first time that the subject of the treatment to be accorded electric railways by the local authorities had been considered by a group so representative of the intelligence of the country.

What was it that the members of the Chambers of Commerce decided? It was that the electric railway was the most practical agency of city transit on a large scale, at least at present; that it should be kept under private ownership, protected from unfair competition and relieved of burdens not connected with the service performed, and that the effect of changes in operating conditions should receive proper recognition on the part of regulatory authorities. This treatment, they further said, should be met by the company in its turn making available for the public at all times the facts as to the results of operation, and by having resident responsible executives wholly conversant with local requirements.

It is not difficult to imagine the consternation which this vote will bring to the politicians, the Mayor Hylans, and the lesser lights of their ilk. Their stock in trade for years—that is to say, theirs and their predecessors—has been to persecute and oppress the street railways, to add to their taxes, to start opposition bus or trolley lines, to berate the managements and when possible to stop any advance in fares. They have pursued these policies because they thought it a popular thing to do, that it would bring votes. Practically everybody, they argued, disliked the trolley company because it was a monopoly. No abuse was too strong to use against it, no attack too severe. Now, what can they do? These very things which they have always thought were so popular have been condemned by the business vote of the nation. It is not the first time in real life as in fiction that the ugly duckling has proved to be a swan or the rejected stone has become the head of the corner.

But electric railways cannot simply accept the verdict and do nothing. If the electric railway is to be an important support to the local business structure in each community it must fulfill its duties and live up to its opportunities. If the public accepts the principle that the fare must be raised if necessary to give the railway a reasonable return, the company must be ready to give good service for that fare and reduce it when the return is excessive. If jitney and bus competition is abolished to help the railway, it must be ready to extend its service by bus or car when the traffic to be gained on any route warrants such expansion. If the community demands responsible resident executives in place of distant direction by holding companies or bankers, the owners must be prepared to adopt this policy.

Nevertheless, the report of the United States Chamber of Commerce and the vote upon it should be of the greatest help now to electric railways. It should help greatly to bring about wider recognition of the railways as public servants and as worthy of the esteem of the community. Railway executives cannot do better than to bring this vote to the attention of their communities as a whole. When considered with the report of the Federal Electric Railways Commission it represents the greatest advance in public recognition of the electric railway which has occurred in years.

How the Camden Section Will Help the Public Service Railway

WHEN Martin Schreiber, chief engineer of the Public Service Railway, was appointed manager of the Southern Division of that property, he immediately decided that one of the first things to be done was to organize a company section with headquarters at Camden. Public Service was one of the pioneers in the company section movement and the results achieved at Newark, the company's main headquarters, showed what could be done at Camden. The activities of the new section were formally inaugurated on Jan. 13 with the enthusiasm which always marks the launching of a new enterprise of this sort. The event is significant because it is nearly three years since a new company section was formed, the latest preceding one being the Rhode Island company section. It is to be hoped that this will precipitate the formation of other sections which have been under discussion for some time, but which had to wait until after the war excitement had died down. Unfortunately, the Southern Division of the Public Service Railway is not large enough to have permitted the formation of a section which could capture the trophy cup presented to the association by the ELECTRIC RAILWAY JOURNAL. The Rhode Island Company section, which holds this cup, started off with such a rush that it secured a remarkably firm hold on the trophy. It is about time, however, that a section should be formed somewhere to lift the cup from its resting place in Providence.

In the meantime the best wishes of the industry will be extended to the infant section at Camden.

An Opportunity and an Obligation at Chicago

WHAT is to be done at Chicago with reference to President Gadsden's recommendations that the association, speaking for the electric railway industry, take action endorsing, or at least defining its attitude toward, the reports of the Federal Electric Railways Commission and of the special committee of the Chamber of Commerce of the United States? As noted in the Jan. 15 issue of this paper (see page 146), President Gadsden has addressed a letter to executives of member companies on this subject and has appointed a committee to bring in a report with recommendations for action at Chicago on Feb. 10. Believing that a discussion of this subject would tend to crystallize opinion, the editors of this paper have asked several members of the Committee of One Hundred and the chairmen of some of the public service commissions who have most to do with electric railway regulation to comment, in this issue and the next, on the probable effects, good and bad, which would result from the endorsement of, or other action on, these two reports.

The position of ELECTRIC RAILWAY JOURNAL on this question can be expressed in a few words. It is that the endorsement of these reports as bases for the electric railways, individually and collectively, to meet the public and work out the details of individual or collective problems would be the greatest and most important single step which the association could take at this time in the effort to restore the industry to a stable and successful status.

The situation is just this: two disinterested bodies, one appointed by the President of the United States, the other representing organized business of the country, the United States Chamber of Commerce, have fully analyzed and reported on the electric railway industry both as to present situation and as to bases upon which future relations should be founded. These reports represent, probably as accurately as can be ascertained, the intelligent opinion and conclusions of the public regarding electric railways. The electric railways, as an industry, have not spoken with reference to these reports. Are they good or bad? Are the railways ready to meet the public on the bases outlined in these reports? Is not the public entitled to know what the railways believe?

Objection to action endorsing these reports is urged by some because the former report mentions service at cost. Others say they cannot in fairness to their properties and security holders reorganize their capital structures over night. But, upon examination of the reports, there is no definite requirement along either of these lines. What these reports do present are fair analyses of the electric railway problem and recommendations and conclusions as to bases upon which future railway operation, financing, franchises, public relations, legislation, etc., should be based. With these conclusions and recommendations no one can differ fundamentally.

Endorsing action compels no one to modify capitalization over night, though such action may in many cases be advantageous. It compels no railway to adopt service at cost now or tomorrow. It does do this—it says to the public, "You have analyzed the railway situation thus and so as indicated by these reports. We believe these reports are fair and are willing to go along with you in the working out of the problems on the bases of these reports, relying on you to do your part." Endorsement is the railway's step in the co-operative action. At present the next step is up to the railways in speaking frankly. By endorsement of these reports, by announcement of their own position as being in line with the public's own analysis, and by action in accordance therewith, the railways "put it up" to the public for real action on its part in the common problem.

Local fears, local details, should not be allowed to becloud the main issue, which is the beneficial, psychological and strategic effect of the association's stating its position with reference to these reports.

It is to be hoped, sincerely, that President Gadsden's special committee will recommend action endorsing the reports and that the association will decide that such action is the most frank and sound move which it can now make.

Governor Miller Takes Up New York City Traction Affairs

GOVERNOR MILLER'S report on traction affairs, sent to the Legislature Monday afternoon, outlines a constructive plan. This is most refreshing after four years of drifting and evasion. Briefly stated, the position of Governor Miller follows:

Owing to an unfortunate division of responsibility in the past between the city and state, the transportation system in New York has been allowed steadily to drift toward disaster. Many roads are in the hands of receivers, many lines have been abandoned, maintenance has been deferred, taxes are unpaid and service has deteriorated, all to the inconvenience and expense of the public and great loss to the city. Yet transportation is a public function, intimately affecting the public welfare, and upward of $850,000,000 of New York City's traction bonds are held by the public. This includes $250,000,000 of city bonds. The time has now come for action, and it would be little short of a public calamity if the opportunity thus presented were allowed to pass. The remedy is a unified system with a single fare and with unnecessary duplication of service eliminated. This means the subways will be the backbone of the system, with the elevated, surface lines and buses eventually merely auxiliary. The subway contracts, with their preferential payments, must be revised; the length of leases is too long. Ultimately such a system would be municipally owned. The State has the duty and the power to act in the matter, and a commission of three is recommended to take over the work of the present city commission and to receive such additional power as may be necessary to extricate the situation from its present difficulties and accord exact justice to all.

The situation is well stated, and we are glad also that the Governor sees the necessity of a co-ordinated system in the proposed revised plan for New York. In this way only can the maximum service be given for the minimum cost to the users, although it would be well in this complete revision of existing conditions to see whether some sort of distance fare cannot be introduced. The reference to ultimate municipal ownership need not cause alarm. This was the ultimate outcome of the present subway contracts, and the Governor in a later statement declares he is opposed to municipal operation. He simply wishes to have all of the means of transportation on the same basis.

But the companies also must make concessions. The subway contracts, the Governor says, need revision in the public interest as experience has shown that the provisions for preferential payments are unfair to the city. Just how far the concessions requested will extend is impossible to say, but the tone of the message throughout indicates a strong desire to administer justice, and the companies have the assurance that in the Governor's opinion the market value of the outstanding securities is much below the intrinsic value of the properties represented. It will certainly mean a great deal to the companies, just as it will to the city, to rewrite their contracts in the light of the experience of the past ten years. We hope for much from the new commission which the Governor asks authority to appoint to undertake this work and that this commission will have ability and power to reach a correct solution. There is probably no other problem in civic affairs in New York whose correct settlement is so important as this.

A Wondrous Novel Reason for Re-election

THE ordinary run-of-mine candidate for the Mayoralty of an American municipality generally considers a promise to make the local electric railway suffer to be a positive claim on the votes of the citizenry. Not so the gentleman who has been Mayor of Terre Haute for three years and likes the job well enough to seek another term. Does he threaten dire things to the street railways? No, not he! Mayor Hunter gives as one of his strongest arguments for re-election the fact that during his administration the local railway has given no trouble at all, at all. Listen to this, ye unhappy managers in Hylanized communities:

"Although our people may not realize it, we have as good a street car system as there is to be found in the country, and in the face of raising of fares all over the country our people ride at 5 cents. In other cities the fare has been advanced to 7, 8, 9 and 10 cents for city fares. Our people save thousands of dollars every year on street car fares alone."

This certainly seems like shining in the glory reflected of the able management of Edward M. Walker, but in all due fairness to Mayor Hunter let it be said that as one of the first municipal executives to appreciate the value of safety car service he has not only co-operated to such good effect with the railway of his home town but has advanced the cause of better service in many other cities through the hearty, unequivocal way in which he has endorsed the principles of Terre Haute operation when questioned by the numerous civic committees that have visited that city to study the safety car. If Mayor Hunter's record in other directions is as good as this, he ought to be reelected by acclamation.

Quotation from the Federal Electric Railways Commission Report

No. 5

THE industry can be restored to a normal basis only by the introduction of economies in operation, improving the tracks, equipment and service and assuring a reasonable return upon the fair value of its property used in the public service when honestly and efficiently managed.

For the purpose of restoring credit, it seems to be the general impression of all witnesses that the first necessity is for the industry to put into effect such economies of operation as will enable it to give good service at the lowest cost.

The Public Utilities Commission of the Nutmeg State

The Connecticut Commission Is Restricted as to Jurisdiction Over Rates and Securities — It Follows a Conservative but Broadminded Policy — It Is Particularly Vigorous in Requiring Effective and Safe Operation of Utilities — Grade Crossing Protection Signs Worked Out in Connecticut—This State Apparently Antedates Massachusetts in Utility Regulation

THE CAPITOL AT HARTFORD IS AN ARTISTIC GILT-DOMED STRUCTURE IN A BEAUTIFUL CITY

THE State of Connecticut has had some sort of a regulatory commission ever since 1849. In that year the Legislature provided for the appointment of three commissioners for each railroad in the state, each to serve three years. Their duties were to examine the roads each year, to see that the companies observed the laws and the provisions of their charters, to hear the complaints of selectmen of the towns, to adjust land condemnation proceedings, etc. Massachusetts is usually credited with having started the regulation idea, but she did not establish a commission until 1864, fifteen years later than Connecticut. In 1850 the law of the previous year was amended in such a way as to provide that the individual commissioners should constitute a board; at the same time the duties were somewhat enlarged. Various other amendments in 1853, 1858, 1865, 1874, 1877 and 1888 enlarged and defined the scope of the commission until it had the usual character of jurisdiction over service and operation. Street railways in 1895 came under the regulation of the Railroad Commission.

One of the early amendments required the commission to investigate accidents occurring on the railroads. The first entry in one of the oldest record books of the Railroad Commission existing in the files of the present commission is the following, not quite as precise and formal as those reports received now from the utilities, but probably as effective:

> Office—HARTFORD, PROVIDENCE & FISHKILL RAILROAD
> Hartford, 24 June, 1857
>
> Rec'd June 26, 1857 — H. HAMMOND, Esq.
>
> DEAR SIR: As our evening train was passing Bristol north side last night it ran over a German, injuring him so that he died in course of night. There seem to be various reports as to the cause of it, many thinking it was suicide, and others thinking it was caused by intoxication. I will give you the particulars hereafter.
>
> Augustus Lagerhauser
>
> Killed
>
> Yours respectfully,
> SAMUEL NOTT,
> Sup't. H., P. & F. R.R.

A State Inspector of Gas was provided for in 1874 in a law which prescribed standards of gas quality, pressure, candlepower, etc., and this officer, with various local deputies, administered the gas laws until 1911.

In 1911 the Public Utilities Commission superseded both the Railroad Commission and the Inspector of Gas, and at the same time the jurisdiction was extended to include communication, light and power, transportation, and water utilities as well as steam railroads, street railways and gas companies. Soon afterward the term "common carrier" as employed in the 1911 act was defined by the Legislature in such a way as in effect to exclude from the jurisdiction of the commission steamboat lines, pipe lines, tank and refrigerator service, parlor car service, stage and bus lines, irrigation, warehouses, etc. Municipally owned utilities are also entirely excluded.

At the present time 180 companies report to the commission; their total plant investment is $1,030,337,207.98, of which some $350,000,000 represents investment in Connecticut. The total is distributed as follows:

Gas	$23,479,028.67
Electric	37,372,132.60
Express	33,284,724.07
Railroads	295,622,443.84
Street railways	98,232,660.22
Telegraph	166,957,003.14
Telephone	348,830,167.33
Water	26,559,048.11

Originally the three members were required by law to be respectively a lawyer, a civil engineer and a business man. The 1911 acts did not prescribe this, but subsequent appointments have been so made that each of these three professions has continued to be represented. The present incumbents are Richard T. Higgins, chairman; Charles C. Elwell and Joseph W. Alsop, with professions in the sequence given above. Nominations are made by the Governor for a six-year period; in case the nomination is not confirmed by the Legislature, the appointee serves only until the rising of the next Legislature. The salaries at present are

$6,000, $5,000 and $4,000 respectively, although in the establishing act of 1911 each was fixed at $5,000. The offices of the commission are in the State Capitol at Hartford.

FUNCTIONS OF THE COMMISSION

The duties imposed by law are little different from those performed by other utility commissions, but the exercise of power is relatively limited, as was also noted above in connection with the range of utilities regulated.

1. *Rates.*—The law requires that rate matters shall be taken up only on formal petition alleging the rate to be unreasonable; the commission cannot begin a rate investigation on its own initiative. The law does not even require the utilities to file changes in rates; most companies, however, are conforming to the practice of keeping the commission informed of the promulgation of new rate schedules.

2. *Service.*—The commission is authorized to prescribe standards of service for all utilities. It also has the power to inquire into an allegation of inadequacy of plant or equipment of a utility and make such orders as public necessity seems to require.

3. *Safety of Public and Employees.*—The commission, as was the Railroad Commission soon after its establishment, is charged with the duty of examining into the circumstances and causes of utility accidents, involving personal injury or public safety, recommending, if possible, means whereby similar accidents could be avoided in the future.

4. *Issue of Securities.*—Only in a few minor instances (resulting from amendments of utility charters) does the commission have any control over the issue of new securities.

Any party aggrieved by any order, authorization or decision of the commission may appeal to the Superior Court, and the ruling of that court stands unless successful appeal from its decision is made to the Supreme Court of Errors, which is permitted to rule only on questions of law and not of fact. Trustees or receivers of utility corporations succeed to all the powers, duties and obligations of company officers relative to the commission except in so far as these may be inconsistent with such powers, duties and obligations as agents of the court appointing them. The bearing of this upon the status of the street railway industry in Connecticut will be touched upon later in this article.

ORGANIZATION OF THE COMMISSION

The routine work of the commission is conducted through the medium of the following organized departments.

Secretary's Department.—Henry F. Billings has been continuously secretary of the Railroad Commission and the Public Utilities Commission since 1893. In the work of conducting the correspondence and files, preparing assignments for hearings and for the engineers he is assisted by an official stenographer and two clerks. Many minor matters are handled directly and expeditiously in an informal way, with the occasional assistance of the auditor or engineers, without resorting to formal hearing and ruling on the part of the commission.

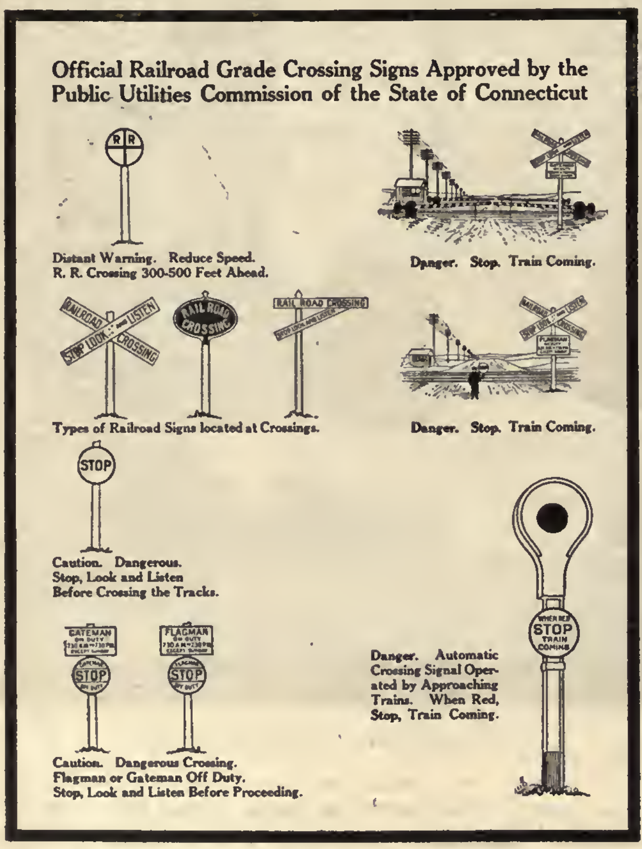
Accounting Department.—Edward Field is statistician and auditor. He examines the financial reports made annually by the utilities, prepares the financial and statistical portions of the annual report of the commission to the Governor, makes special investigations of utility accounts and special statements of utility experience as required from time to time by the commission. The auditor has the aid of one clerk.

Engineering and Inspection Department.—The engineering staff consists of three engineers, E. Irvine Rudd, chief engineer; Joseph P. Wadhams, assistant engineer, and A. E. Knowlton, electrical engineer. The engineers

CONNECTICUT'S PRESENT COMMISSIONERS, CHARLES C. ELWELL, RICHARD T. HIGGINS, CHAIRMAN, AND JOSEPH W. ALSOP make an annual inspection of the tracks, overhead construction and signal systems of the steam and electric railways and occasional inspection of plant and equipment of other utilities. The inspection of the street railways is made in the spring or summer of each year, all lines being covered on special cars, the engineers of the commission being accompanied by representatives of the companies concerned. On this inspection attention is paid to the general physical condition, the riding qualities of the track, maintenance of the electrical distribution system, functioning and adequacy of signal systems and operating signs.

The steam railroads are inspected in the autumn of each year by special train in company with officials of the railroad to determine the physical condition and the adequacy of signal and gate protection at grade crossings of the railroad with highways.

Whenever any accident occurs attended with serious or fatal personal injury or involving public safety the utilities make immediate report by wire, followed by written confirmation, and an engineer makes an investigation for the purpose of determining the circumstances and causes, reporting such recommendations as will in his opinion be the means of preventing similar accidents in the future. The department is on call at all hours in order that as prompt as possible an investigation may be made.


Official Railroad Grade Crossing Signs Approved by the Public Utilities Commission of the State of Connecticut
R R
Distant Warning. Reduce Speed. R. R. Crossing 300-500 Feet Ahead.
Danger. Stop. Train Coming.
RAILROAD STOP LOOK AND LISTEN CROSSING
RAILROAD CROSSING
RAIL ROAD CROSSING
STOP LOOK AND LISTEN
Types of Railroad Signs located at Crossings.
Danger. Stop. Train Coming.
STOP
Caution. Dangerous. Stop, Look and Listen Before Crossing the Tracks.
GATEMAN
FLAGMAN
STOP
STOP
WHEN RED STOP TRAIN COMING
Danger. Automatic Crossing Signal Operated by Approaching Trains. When Red, Stop, Train Coming.
Caution. Dangerous Crossing. Flagman or Gateman Off Duty. Stop, Look and Listen Before Proceeding.

RAILROAD GRADE CROSSING SIGNS AND SIGNALS, NOW STANDARD IN MOST STATES

The engineers are called upon to investigate complaints arising from the service or safety practices of any of the utilities.

Meter and Service Testing Department.—The testing of gas, electric and water meters and investigations of gas quality, electric service, etc., are performed by the electrical engineer. The commission has established rules and regulations governing service and practice of these utilities and for the purpose of making meter tests upon complaint has established necessary laboratories. The gas laboratory is located at the Capitol and is equipped not only to test meters but to test gas for heating value, candlepower, purity, pressure, etc. The electrical laboratory is located at the Sheffield Scientific School of Yale University in New Haven and the equipment comprises refined electrical instruments and facilities, including a sine wave alternator; the electric companies are required to send in their primary standards once every six months for checking and resealing.

In 1917 the commission established rules and regulations governing the joint use of wood poles by several utilities in the streets and highways after a series of accidents to linemen and pedestrians had indicated the urgency of standardizing the relative locations of electric light and power, telephone, street railway and other circuits on the poles, as well as the method of attachment. Similar specifications have since been promulgated in other states. At present the order is in process of revision by a committee of utility engineers co-operating with the commission's electrical engineer and when reissued will be accompanied by additional rules covering joint construction on wood poles of higher voltage circuits, others specifying standards for the crossing and paralleling of high-voltage lines with other lines, highways and railroads, and still others governing the precautions to be taken to insure safety of employees working on lines and equipment whether energized or de-energized. The method and manner of construction of all new work or reconstruction of higher voltage lines must be approved by the commission and the line inspected before energizing.

The commission has always stressed the protection to be provided by the railroads at highway grade crossings and early in its existence the chief engineer, C. C. Elwell, now commissioner, gave much time to the development of various signs, visible and audible signals, painting of gates with diagonal slashes, etc. The effort to assure maximum protection to the traveler on Connecticut's much-traveled highways was vigorously furthered by the railroads themselves and the signs and signals adopted then have been recognized as standard by the railroad associations and other state commissions. The examinations of these signs and signals is made an important part of each annual inspection of the railroads. So important is this whole matter of grade crossing protection considered that the railroads are required to report regularly to the commission all failures of audible and visible audible signals, with complete details as to the causes, duration of failure, etc. The maintenance of these signals is now of such a high order that they are on practically the same plane of reliability as those employed by the railroad for the movement of trains.

THE STATUS OF THE STREET RAILWAY

Connecticut has nine street railway companies with a total operated mileage of 750 on the single-track basis. Of this amount almost 600 miles is operated by the Connecticut Company. During the last two years 69 miles of track have been abandoned, 61 of which had been operated by the Shore Line Electric Railway. Financial statistics summarized for all the companies for the year ended Dec. 31, 1919, are as shown in the table on page 213.

The 1919 Legislature foresaw this situation and directed the Public Utilities Commission "to investigate the conditions under which the street railways of the State are operated and to report its findings to the General Assembly at its January session, 1921, together with such recommendations and suggestions with respect to legislation as it may deem proper and advisable in order to place such street railways upon a safe and efficient operating basis." In proceeding to carry out this mandate the commission decided to have made an approximate valuation of the physical properties of each of the systems and also a thorough study of the financial and corporate history of each. Unfortunately the Legislature did not appropriate any special fund for this purpose and it was therefore necessary for the three engineers and the auditor to perform the work themselves, with only occasional technical and clerical assistance. A somewhat novel method of arriving at sufficiently accurate estimates of the various pieces of physical plant was developed and as a result some $50,000,000 of property was evaluated at a cost to the commission of less than $10,000, proportions in contrast with the usual cost of such undertakings. The costs to the companies in supplying information and assistance was of the same order of magnitude.

With 80 per cent of the mileage the Connecticut Company attracts the most attention both in Connecticut and outside. This company was formed by the New York, New Haven & Hartford Railroad from many local companies in furtherance of President Charles S. Mellen's scheme to have under one control all the rail and water transportation agencies of New England. Suit brought by the federal government to dissolve this combination as one in restraint of trade led to the court's appointing in 1914 five federal trustees, acting as a board of directors, with a total salary list of $31,500 annually, of which amount the Connecticut Company pays $16,500 and the New York, New Haven & Hartford Railroad the balance of $15,000. There was thus created an annual expense of $31,500 for such supervision as is usually performed by a board of directors without pay. The trustees were authorized and directed to sell and dispose of the stock of the Connecticut Company, but although nearly seven years have elapsed, no part of the stock has yet been sold and the company and its managerial policies are under the direction of these trustees. Of course, the trustees are not authorized to sell the physical property or any part of it.

STATISTICS OF CONNECTICUT ELECTRIC RAILWAYS

Total revenue	$13,309,736.67
Total operating expenses, including taxes	12,297,698.56
Net operating revenue	1,012,038.11
Income from auxiliary operations	357,215.33
	1,369,253.44
Rentals, interest on funded and unfunded debts, etc.	1,899,852.07
Total deficit	$530,598.63

This limitation, this provision by the court that only the stock and that none of the physical property of the company may be sold, has made it difficult, in the eyes of the commission, to work out the best policy for the Connecticut Company and the public to pursue in their mutual relations. As noted previously, the trustees are not subject to the commission on matters falling within the duties and obligations imposed by the court appointing them. The commission has felt this to be so great a limitation that it has recommended to the Legislature that the Attorney-General be empowered to request the court to discharge the receivers and return the stock and management of the company to the New York, New Haven & Hartford Railroad.[*]

Until the work of appraising the street railway properties was undertaken the commission had done little more in the line of valuation than was demanded by cases that arose. In general the practice of the commission in these few cases has been to secure a reproduction new figure for so much of the property as is used and useful in serving the public and then consider depreciation deduction along with the so-called intangibles in the light of the company's origin, history, experience and immediate and future needs. The commission, in estimating future operating expenses and revenues, has never imposed specifically either the straight-line or sinking-fund method of depreciation accounting, rather treating each case by itself and generally leaving the details to the corporate management.

Industrial Socialization in Germany

IN A RECENT communication from the Berlin correspondent of this publication there is extended analysis of the present move toward socialization of the industries, particularly the coal mines. The correspondent says in part:

> The import of the socialization of the coal mines goes far beyond the immediate result it might have. The present strike will decide which course the country will take with regard to socialist doctrines and the working classes in general. If defeated in this, socialization will be, if not a thing of the past, a matter of a rather remote future. Conditions for radical measures against the coal owners are exceptionally favorable. The control of the mines has passed into the hands of a comparatively few men who have accumulated enormous wealth and influence, of which not always wise use is made. While the impoverished population is made to suffer under the increased cost of fuel, the annual report of the mines openly shows gains of a magnitude before unheard of, with still larger profits hidden behind the screen of intricate accounting. Even the bourgeois class supports the demands of the workers to convey the properties into commonwealth possession.

The position of the mine owners, on the other hand, is shown to be against socialization and they present strong arguments, which go to prove chiefly that private enterprise is indispensable to the present task in Germany. There are several proposals from economists, labor elements and groups of private owners, but the outstanding one is that of Stinnes, an industrial leader of great wealth, power and astuteness.

The process of amalgamation proposed by Stinnes has progressed with surprising speed during the past few months. On this the correspondent says:

> Its trend is to link together producers and manufacturers of all lines of goods, from the coal mine up to the finished product. The expression "vertical trust" has been coined here for such combines, intended to indicate that the combine followed the manufacturing process from the lowest stage to the highest, in contradistinction to existing trusts, which combine manufacturers of the same state. Vertical trusts not containing business rivals will not concern themselves with the control of prices. Their chief interest will be economic production whereby the various members will stimulate one another, and each member will be in a position to profit by the experiences of the others. A number of such trusts have lately been formed among the very large works. Noteworthy is the huge combine entered into between the work under Stinnes' control and the Siemens group, in itself a combine of large dimensions.
>
> Trusts of this kind are an entirely new departure and indicate that the trusts and syndicates of former times formed to control prices and to distribute production have been abandoned. This will ultimately end in the fusing together of German manufacturers into groups and in the disappearance of the individual manufacturers.

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[*] See special report of the Connecticut Public Utilities Commission to the Legislature, ELECTRIC RAILWAY JOURNAL, Jan. 8, 1921, page 95.

Chamber of Commerce Vote

In Answer to Referendum Sent Out by National Chamber Business Men of the Nation Declare by Practically a Unanimous Voice that the Electric Railway Ought to Be Preserved and Encouraged

THE long-looked-for announcement by the United States Chamber of Commerce in regard to the vote on Referendum No. 33 was made from Washington on Jan. 22. It will be remembered that Referendum No. 33 was sent out by the national chamber to its members on Nov. 29 and it called for a vote on eight points relating to electric railways. The voting closed on Jan. 3, when all ballots were due. The propositions submitted and the vote recorded on them follow:

1. Existing traction facilities should be conserved—for, 1,689; against, none.
2. The attitude now taken toward street railway problems should be based on the present and future needs of the community—for, 1,677; against, none.
3. The attitude which is taken toward street railway problems should contemplate private ownership and operation—for, 1,657; against, 24.
4. Regulation should everywhere be instituted that will follow promptly changes in the situation of the companies rendering services of local transportation—for, 1,666; against, 4.
5. Provision should be made against the consequences of unfair competition—for, 1,653; against, 16.
6. All burdens unrelated to the service performed should be removed from street railways—for, 1,460; against, 167.
7. Official responsibility should be definitely fixed for the application of regulation—for 1,682; against, 3.
8. Each company should seek to have available for the public at all times the facts as to the results of operation and should have resident responsible executives wholly conversant with local requirements—for, 1,683; against, 1.

The referendum on public utilities is only one of thirty-three which have been taken by the chamber on different public topics. The questions submitted were accompanied by a report of the committee on public utilities which set forth considerations leading up to the recommendations made. There also went out references to arguments in the negative so that members might have the opportunity of obtaining the fullest information with regard to the proposals on which a vote was asked.

RECOMMENDATIONS BY COMMITTEE

With reference to the first proposition that traction facilities should be conserved the committee declared that the attitude taken by the public should be constructive and not destructive, adding that, "the point of view must be that local transportation is an industry to be fostered and developed, with ample provision for correcting abuses and for preventing any one from taking unfair advantage of the public attitude."

In support of the recommendation that the present attitude should be based on present and future needs of the community, the committee called attention to the widespread belief that in the earlier history of many traction companies there had been financial mismanagement, but pointed out that, "if it be conceded that the public interest is to obtain good service at lowest cost and that street railways are essential and necessary, then the sensible way to deal with the problem is to permit existing organizations to earn a sufficient sum over their operating expenses to induce investment of capital for extensions and improvements."

Private ownership and operation were recommended by the committee with the declaration that, "a canvass of every consideration that has been brought forward in support of public ownership and operation has resulted in the committee's finding in it no solution for present problems or means of meeting future requirements."

Advocating regulation that will follow promptly changes in the situation of transportation companies, the committee asserted that elasticity was necessary because delays in the application of remedies that bear on a matter of public interest are detrimental to the public itself.

Of unfair competition the committee declared that while local transportation, as it now exists, should not be perpetuated, regardless of advances that may be achieved, a traction company should not be subjected to competition from any other source which is not under corresponding regulation and obligations.

In connection with the proposal that traction companies should be relieved of burdens unrelated to the service performed, the committee said that rates charged for street railway transportation should not be made an indirect method of taxation and that a street railway company should be taxed only on the basis of other comparable taxpayers.

Recommending that official responsibility for the application of regulation should be definitely fixed, the committee expressed the belief that a street railway company should be able to look to a single agency of the public as directly responsible for the application of regulation and that there should be no division of authority that might permit escape from responsibility.

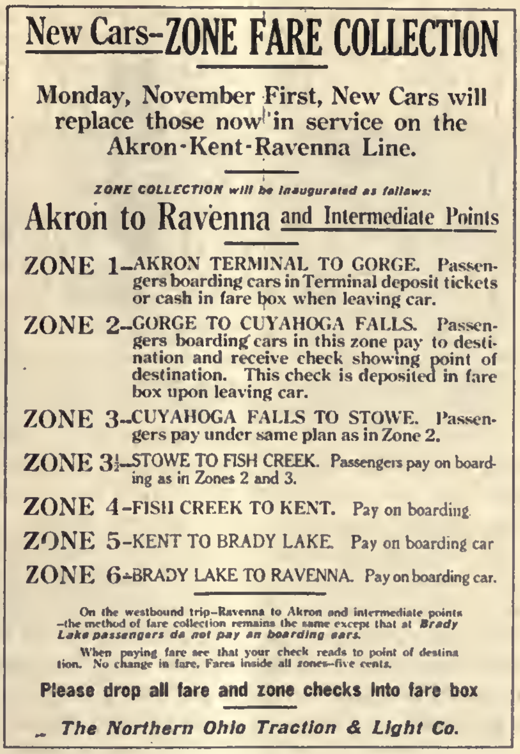
With regard to its recommendation that companies should have available to the public facts as to the results of operation and that they should have resident responsible executives conversant with local requirements, the committee said: "Adequate provision for having the public informed regarding the company and its operations and for having the company acquainted with the needs of the community will serve to prevent controversies that may have little relation to facts and to concentrate attention on the one question which is of paramount importance to the company and to the public—adequate and efficient service at the lowest rates consistent with the maintenance of such service."

These members of the Public Utilities Committee signed the report: Lewis E. Pierson, chairman board of directors Irving National Bank, New York; Henry G. Bradlee, president Stone & Webster, Boston; Arthur W. Brady, president Union Traction Company, Anderson, Ind.; F. B. De Berard, director of research, Merchants' Association, New York; E. K. Hall, vice-president American Telephone & Telegraph Company, New York; Albert W. Harris, president Harris Trust & Savings Bank, Chicago; Charles L. Harrison, president Sinking Fund Trustees, City of Cincinnati; J. W. Lieb, vice-president New York Edison Company, New York; H. L. McCune, of the firm of McCune, Caldwell & Downing, Kansas City; P. N. Myers, president St. Paul Association of Public and Business Affairs, St. Paul, Minn.; John W. Van Allen, of the firm of Wilcox & Van Allen, Buffalo, N. Y.

Positive Interurban Fare Collection

Northern Ohio Traction & Light Company Adopts Zone Check System for Showing Each Passenger's Destination and Employs Fare Boxes and Zone Check Boxes in Combination Pay-Enter, Pay-Leave Fare-Collection Plan

DISPENSING with the common hat-check system of identifying passengers, the Northern Ohio Traction & Light Company, Akron, Ohio, has substituted a passenger pass-out check or zone check for identifying passengers. This plan has been placed in operation in conjunction with locked fare boxes and a combination pay-enter, pay-leave fare collection system on the Akron-Ravenna and Canton-Massillon divisions. The new plan appears to be very successful in overcoming loss of revenue from over-riding and in bringing all revenue collected into the treasury of the company. The first full month's operation under the new system produced an increase in revenue attributable to the method of collection of at least 14 per cent. The plan was installed on the two divisions named simultaneously with the installation of new Peter Witt type cars, equipped with multiple-unit control. Except at the free entrance loading points, later defined, only the center doors of these cars are used for entrance and exit of passengers. The reason for the employment of this type of car on these lines was primarily to keep as far as possible to a standard car, as this simplifies the equipment problem over the system. The multiple-unit equipment of these cars, however, has made it possible for the company to operate the service on the Akron-Kent-Ravenna division with four less men than were formerly required with the older type cars not having multiple-unit control.



New Cars–ZONE FARE COLLECTION

Monday, November First, New Cars will replace those now in service on the Akron-Kent-Ravenna Line.

ZONE COLLECTION will be inaugurated as follows:

Akron to Ravenna and Intermediate Points

ZONE 1–AKRON TERMINAL TO GORGE. Passengers boarding cars in Terminal deposit tickets or cash in fare box when leaving car.

ZONE 2–GORGE TO CUYAHOGA FALLS. Passengers boarding cars in this zone pay to destination and receive check showing point of destination. This check is deposited in fare box upon leaving car.

ZONE 3–CUYAHOGA FALLS TO STOWE. Passengers pay under same plan as in Zone 2.

ZONE 3½–STOWE TO FISH CREEK. Passengers pay on boarding as in Zones 2 and 3.

ZONE 4–FISH CREEK TO KENT. Pay on boarding.

ZONE 5–KENT TO BRADY LAKE. Pay on boarding car

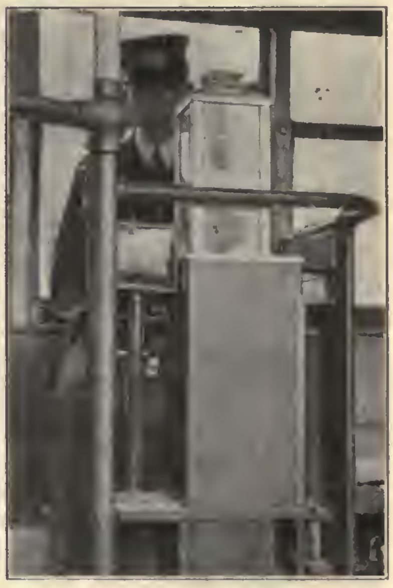
ZONE 6–BRADY LAKE TO RAVENNA. Pay on boarding car.

On the westbound trip–Ravenna to Akron and intermediate points–the method of fare collection remains the same except that at *Brady Lake passengers do not pay on boarding cars.*

When paying fare see that your check reads to point of destination. No change in fare. Fares inside all zones–five cents.

Please drop all fare and zone checks into fare box

The Northern Ohio Traction & Light Co.



LOCATION AND MOUNTING OF FARE BOX AND ZONE-CHECK ISSUING BOX—INCIDENTALLY, NOTE NEAT METHOD OF CARRYING SIGNAL FLAGS AND FUSES. IN CENTER, SAMPLE OF STATION POSTER USED TO INFORM THE PUBLIC OF THE NEW FARE COLLECTION SYSTEM

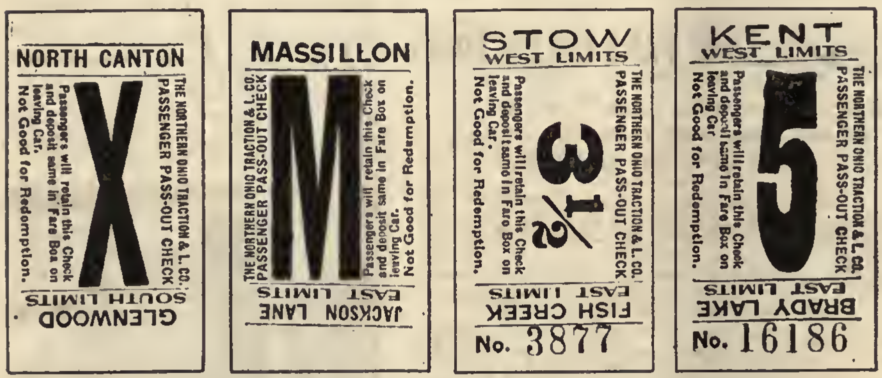
The two lines on which the positive system of collection, using zone checks, has been installed are of an interurban character with a heavy on-and-off movement of passengers all along the route, as well as much through riding, making it difficult for conductors to keep an adequate check on the passengers. The details of the fare collection scheme follow:

The Akron-Kent-Ravenna division is divided into six zones, the fare limits of which are the same as existed prior to the installation of the zone-check system, and the rate of fare is 5 cents for each zone as before. These zones are numbered from 1 to 6 from Akron to Ravenna and the numbers remain the same for both directions of travel. There is also an additional zone numbered 3½, intended to take care of a special condition imposed by a local franchise agreement. Zone checks, 1 in. x 2 in., of different colors for each of the seven zones are supplied to the conductor. On both sides of these checks the zone number is printed in conspicuous figures, together with the zone limits and a serial number. The checks thus have both a color and number identification to aid the conductor.

Passengers enter cars within the city limits of Akron (Zone 1) eastbound, or Brady Lake (Zone 5) westbound, without paying fares or showing tickets, and then pay upon leaving the car. These two zones are called free-entrance zones and entrance is free in them so as to facilitate the very heavy terminal loading which occurs in them. In all other zones passengers pay upon boarding the cars and receive a pass-out check which shows the zone to which they have paid and is deposited in the fare box when they leave the car.

These free-entrance zones need not be at the end of the line, but can be placed anywhere that loading conditions may dictate. For example, in summer there is very heavy travel between Akron and Brady Lake, a popular summer resort for Akron people. These two points are therefore made the eastbound and westbound free-entrance loading points, respectively. But in winter this resort business falls off. So the free-entrance zone both ways has been transferred for the winter months to Kent to favor the factory workers there. No confusion seems to have resulted from the use of the pay-leave system in these free-entrance zones with pay-enter system at all other zones.

For a passenger who boards the car in a free-entrance zone and leaves the car within the same zone the conductor deposits a zone check for that zone in the fare box when the passenger, upon alighting, deposits his nickel fare. A passenger boarding a car in Zone 2, for example, and desiring to ride to a point, say, in Zone 5, drops 20 cents in the fare box and receives a Zone 5 check from the conductor, which is dropped in the fare box as the passenger leaves the car. Likewise, when a car is operating in the other direction, a passenger boarding at Zone 5 and desiring to ride to a point in Zone 2 or 1 will drop his fare of 20 cents or 25 cents in the fare box and receive a zone check for Zone 2 or 1, respectively. Any passenger who is without a zone check upon leaving the car must be one of those who boarded in the free-entrance zone, and the fare collected from him is that covering the number of zones passed, the conductor depositing in the fare box, after the passenger has inserted his fare, the zone check for the zone in which the passenger alights. Notices are posted in the cars to the effect that any passenger not having a pass-out check will be required to pay full fare from the free-entrance zone. Passengers boarding in other zones are therefore more careful to get a check upon paying their fare and not to lose it.



NORTH CANTON
X
THE NORTHERN OHIO TRACTION & L. CO.
PASSENGER PASS-OUT CHECK
Passengers will retain this Check and deposit same in Fare Box on leaving Car.
Not Good for Redemption.
SOUTH LIMITS
GLENWOOD

MASSILLON
M
THE NORTHERN OHIO TRACTION & L. CO.
PASSENGER PASS-OUT CHECK
Passengers will retain this Check and deposit same in Fare Box on leaving Car.
Not Good for Redemption.
EAST LIMITS
JACKSON LANE

STOW
WEST LIMITS
3½
THE NORTHERN OHIO TRACTION & L. CO.
PASSENGER PASS-OUT CHECK
Passengers will retain this Check and deposit same in Fare Box on leaving Car.
Not Good for Redemption.
EAST LIMITS
FISH CREEK
No. 3877

KENT
WEST LIMITS
5
THE NORTHERN OHIO TRACTION & L. CO.
PASSENGER PASS-OUT CHECK
Passengers will retain this Check and deposit same in Fare Box on leaving Car
Not Good for Redemption.
EAST LIMITS
BRADY LAKE
No. 16186

FULL-SIZE REPRODUCTION OF ZONE CHECKS USED ON TWO DIVISIONS OF N. O. T. & L. CO.

Any passenger boarding a car at any point and depositing 5 cents for a ride entirely within that zone receives a zone check corresponding to the zone in which he boards the car. Should a passenger attempt to over-ride, this fact would be easily shown by the zone check deposited in the fare box as he is about to leave the car. Thus a passenger leaving in Zone 5 and depositing a Zone 4 check (or a Zone 6 check, if the car is running in the other direction) will be required to deposit an additional 5 cents and the conductor will issue a zone check for this one zone and deposit it in the fare box.

The Massillon-Canton-North Canton Division is divided into six zones, which are numbered X, T, O, C, B and M, to avoid confusion with the zone checks of the other line. These letters were selected, C for Canton and M for Massillon, and the others to avoid letters that looked alike or might be mistaken by the conductor in a hurried inspection. The zone limits on this division are also the same as the fare limits enforced before the installation of the zone system. Different colored zone checks are used for each zone. The free-entrance zones are in Massillon eastbound and at Canton Square westbound. In all other respects the same procedure is followed on the Canton-Massillon Division that has been described for the Akron-Ravenna Division.

Conductors are instructed to permit the fares deposited in the fare box to lie on the inspection plate long enough for proper inspection and to determine that the correct amount has been inserted for the distance which the passenger states he wishes to travel. When making change for passengers, the conductor returns the full amount to the passenger, who deposits the exact fare in the box. Passes, tickets, zone checks and cash are all deposited in the locked fare box.

The issuing of zone checks is greatly facilitated by a new zone-check box equipped with eight ticket slips and installed adjacent to the fare box. These zone boxes are a recent addition to the scheme. They were made by the Cleveland Fare Box Company, which also supplied the fare boxes. The zone ticket boxes are constructed of steel and fitted with a lock. A casting is fastened to the bottom for ready mounting on a pedestal beside the fare box in a convenient position for the conductor. Each conductor turns in on his report sheet the starting and ending serial numbers of each of the zone check stacks, as he is required to account for all zone checks issued each day. If a car is disabled and taken off a run the zone checks are collected and put in the fare box and hat checks issued to transfer passengers to another car.

If a passenger presents a ticket to any station on another division the conductor drops an "honored but not lifted" coupon into the fare box, pastes the stub on the back of the ticket and punches the ticket, and then when the passenger leaves the car he must show this ticket to the conductor for identification.

The zone checks are used only once, though they are turned back to the office. The additional cost of these checks over that of hat checks is very little and the total cost is not sufficient to warrant the expense of sorting for reuse.

An interesting by-product of the zone-check system is the opportunity afforded for a traffic check. Under the present system the company knows only the destination of passengers and for ordinary purposes it may be assumed that the number of passengers originating at any point is approximately equal to the number leaving the car in that zone. However, an accurate check could very readily be obtained if the zone numbers from 1 to 6 were printed on the side of the checks and then the conductor punched the zone number at which a passenger boards the car. The check issued to a passenger would then show both his destination and boarding point. This scheme could be employed constantly if it were desired to keep a continuous check on traffic, or it could be employed for a periodic check.

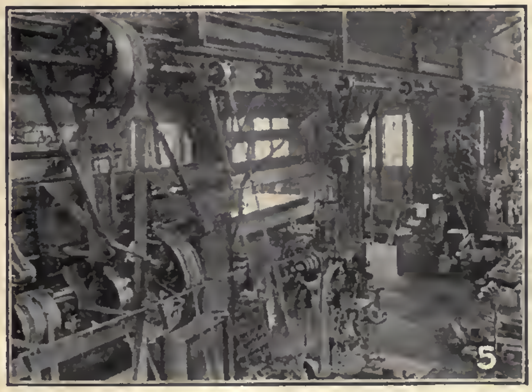
Maintenance on the B., A. & P.

Seven Years of Operation Under Strenuous Conditions Have Demonstrated the Staying Qualities of the Electric Locomotive—Maintenance Costs with This Type of Motive Power Have Been Substantially Less Than with the Steam Engine—A Shop Force of About Thirty Men Suffices for Inspection and Repair Work

BY F. W. BELLINGER
Electrical Superintendent Butte, Anaconda & Pacific Railway, Anaconda, Mont.

ONE of the steady-going electrically operated railroads, which now attracts little attention because outshadowed by the more extensive electrification of the Milwaukee Railway, is the Butte, Anaconda & Pacific, operated mainly between Butte and Anaconda, Mont. One of the editors of the ELECTRIC RAILWAY JOURNAL recently inspected this property and expressed his pleasure at the excellent record it was making as to reasonable expense for maintenance and in furnishing excellent passenger and freight service. He requested the writer to set down the following notes for publication in the paper. The accompanying pictures were taken to show the general layout of the shops in Anaconda, the operating headquarters, and also to give a certain "atmosphere" to this brief account of what is being done here from day to day.

At the Pasadena meeting of the National Electric Light Association, held in May, 1920, the writer furnished a paper, giving the results of experience on the B., A. & P. since its electrification in 1912 and 1913. This paper was abstracted in the issue of the ELECTRIC RAILWAY JOURNAL for May 29, 1920, page 1101. It was repeated at the Atlantic City convention of the American Railroad Association, mechanical section, in June. Supplementing this article it is of interest to note that the railway operates a total of twenty-eight 80-ton General



IN AND AROUND THE B., A. & P. SHOPS AT ANACONDA, MONT.

1. Tractor used to reinforce the electric locomotive.
2. Motor field frame in process of overhaul, axle bearings in foreground.
3. This partial view down the shop shows the excellent lighting, conducing to efficient maintenance.
4. Armature in the lathe, showing condition after many years of wear.
5. A glance across the shop from the crane.
6. Group of locomotives in front of the shop.
7. The "jitney bus," or line car, ready for business.

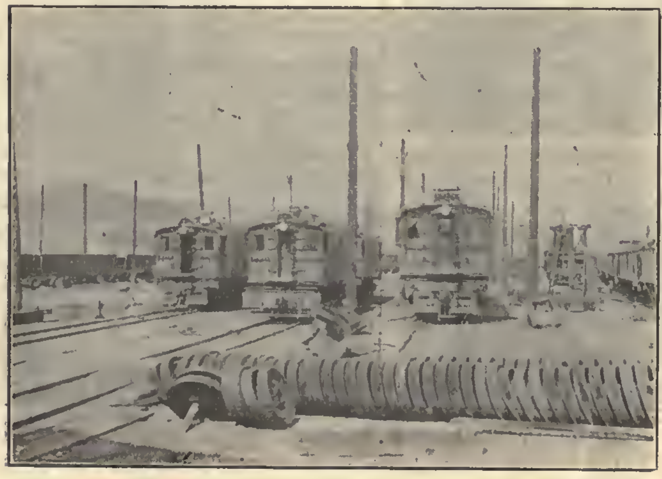
TYPE OF ELECTRIC LOCOMOTIVE WHICH IS "GOING STRONG" ON THE B., A. & P.

THE STEAM ENGINE IS OUTNUMBERED AT ANACONDA—ONLY FOUR LEFT

Electric locomotives and three 40-ton tractive trucks, which are used in switching service to give the equivalent of a 120-ton locomotive operating at a speed lower than that of the 80-ton units. A view of one of these tractors in the shops for overhaul is reproduced herewith. The railway also operates four steam locomotives, which are used on a division west of Anaconda and in a sandpit. The company also owns 1,176 steel hopper cars and 295 other freight and passenger cars, all of which, together with the electric and steam locomotives, are maintained in the shops at Anaconda. The change from steam to electric power occasioned no additional shop equipment, with the exception of a tension device which was purchased recently.

MAINTENANCE FORCE IS NOT LARGE

In the shops the electrical maintenance force comprises two electricians and the mechanical force includes five machinists, two machinist's apprentices, four helpers, two drillpress men, one wiper, one oiler, one boilermaker and his helper, three blacksmiths and three helpers (working principally upon steel cars), a pipefitter and helper, a carpenter and two painters. The electrical men are employed for other work in addition to maintaining the electrical equipment of the locomotives. These additional duties consist of caring for the car-heating and lighting equipment, the power, heating and lighting of the locomotive and car shops and similar work.



HERE THE CAMERA CAUGHT A BUNCH OF LOCOMOTIVES IN THE YARD

During the seven years which these electric locomotives have been in operation the average cost of repairs as compiled for the Interstate Commerce Commission's records averages approximately 6 cents per locomotive-mile. This compares with 16 cents per locomotive-mile for steam locomotives in the same service during the year 1909. The cost of labor and materials is considerably greater at present than in 1909, so that the ratio of 6 to 16 cents is ultra-conservative.

Passenger locomotives are inspected electrically and mechanically every thirty days and freight locomotives every forty days. The maximum time between inspections was seventy-five days in one instance and frequently the periods mentioned above are exceeded by a week or ten days. Locomotives operating at Rocker, twenty-two miles from Anaconda, receive no attention other than oiling and brakeshoe adjustment.

Inspections are made out of doors, over a cinder pit, summer and winter. This out-of-door inspection, especially during winter months, has been found necessary due to sweating which follows the placing of locomotives in and out of heated shops. It has been proved that this procedure has eliminated no small number of armature failures.

A light overhauling of trucks is given when tire wear makes turning or renewal necessary, or after about 25,000 miles running. Flange wear is very heavy due to the curvature of tracks at the mines in Butte and at the smelter at Anaconda. A total of 3,267 deg. of curvature exists between these points, which is equivalent to turning a train approximately nine times.

Overhauling comprises the following: Turning tires, babbitting bearings, when necessary, lining shoes and removing lateral.

The B., A. & P. has had a number of notable life records of parts of its equipment. For example, take the contactor tips. Of these but 21 per cent have had to be renewed after seven years of service. Again, the Grade F pinions have averaged a life of 100,000 miles, while motor brushes have averaged 12,000 miles. So far it has not been necessary to turn any of the main-motor commutators, the wear being only appreciable. The average life of pantograph rollers has been one year.

The rollers are made from Shelby steel tubing 5 in. in diameter and 24 in. long. These are mounted on Hyatt roller bearings, No. 16,410, which in turn are housed in aluminum castings secured in either end of the tubing.

Table I shows the over-all operating and maintenance costs of these electric locomotives during 1919. Recently they operated for twenty-three months without an armature failure of any kind.

TABLE I—OPERATING COST DATA FOR B., A. & P. ELECTRIC LOCOMOTIVES

	Cents per Mile
Maintenance of equipment expense, including repairs, supervision, shop machinery tools	14.15
Locomotive engineers and firemen	11.55
Engine house service	2.60
Cost of electric power	15.26
Lubrication	0.81
Other supplies	0.58
Total	44.95
Maintenance of equipment expenses (repairs) less supervision, shop machinery tools	6.48

Another item of interest is that the air-compressor motors have operated continuously since 1913 without an armature failure. In fact there was but one failure of any kind, and this was due to the breaking of a wire between field coils.

Some idea of the work done by these locomotives can be obtained from the fact that two of them haul sixty-five loaded ore cars, averaging 71 tons per car, up a ruling grade of 0.3 per cent at an average speed of 15 m.p.h.

Containers the Ultimate Answer

By Their Use in Freight Transportation the Use-Efficiency of the Freight Car and the Motor Truck Will Be Multiplied and Each Will Do the Work for Which It Is Best Adapted

ON JAN. 25 Col. J. C. Bonner presented an address before the Traffic Club, New York, on his "container" system for freight transportation. An abstract follows:

To be universally serviceable and practical containers must have these prerequisites: They must be commodious and mounted fixedly on four wheels, wagon type, for purpose of independent movability in any situation. To be conveniently available as well as sufficiently serviceable, they should be as numerous as flivvers and so alike in appearance and dimension standards as to require reference to numeral insignias for identification, hence from exteriors the sealed contents would be unknown. They should house sufficient light bulk freight to qualify a revenue tonnage load and need, therefore, be graduated to carry either 5 or 8 tons. They should be as light as possible consistent with strength.

In operation they should be loaded and sealed at the warehouse by the shipper's clerks and in due course be delivered directly to the consignee's warehouse whether the route covered is over streets, on water or over rails. They should ever be in readiness to be pulled either by a team or tractor, or to trail or be carried astride auto chassis trucks, chassis steam railroad cars or trolley chassis cars; to be lifted intact to elevation walls of construction work, put in cold storage or down in a vessel hold. Figuratively, a "through container wagon" should be a sealed heavy contained luggage trunk, but a wheeled perambulator all the while.

Any vehicle exclusively patterned for the rail or for highway transportation is not fully scientific for freight handling, since neither can travel both rail and highway as is generally needed, nor is a vehicle body alone, since it requires crane service at transfers. A "through container" wagon must qualify to undertake a 5-mile or even greater distance haul over a highway that rates but one-twenty-fifth of any comparative means of mobility and then must proceed by rail the longer distance to get such advantage.

Consider now that any number of container wagons can be moved to a position astride lengthwise of a railroad siding and be aligned by following a guide rail. Provided, now, that the wagons have no cross axles, and they are not needed, a locomotive can then back under them a sufficient number of fitting chassis freight cars, capable each of holding three wagon units. Then by the manipulation of train air control the wagons rise so that the wheels clear the rails and the loading is completed and the train ready to move. The unloading of the containers is as instantly done by simple air release of the carried wagon, so that the fixedly mounted wheels again tread the ground.

Some time since, Henry L. Doherty, who has recorded the greatest individual success as an operator, invited a number of executives of railway systems, railway equipment and automobile corporations to a conference at his office. He told them that the interests then present and others of like relation should together expend, if required, a million dollars to develop and demonstrate by operation some means to move freight without the load being rehandled during transit and to attract a greater percentage of freight to the rail, since $40 worth of electrical energy on rails will equal the tractive work of $240 worth of gasoline on a highway, and because a ton is moved over rails at one-twenty-fifth the tractive resistance that moves a ton over a highway. Committees of engineers and of executives studied assiduously the matter for a year. All the reports approved it and an organization is now functioning. Systems represented among the signatory member corporations of the group that is now developing the "through container" vehicle system operate upward of 4,000 miles of railways and show assets in excess of two billions of dollars. The group units of the rail wagon system* consist of the "through container" or rail wagon, a chassis steam railway carrier car, an electric railway chassis car, an auto truck chassis, a railway alignment switch and freight movement terminal building and tracks.

Under the "through container" system, with freight cars continuously mobile, and with auto truck chassis, tractors or teams of horses ready instantly to move the rail wagons from the rail, cars and trucks will not have to wait during the rehandling process and much of the present yard space and tracks can be used otherwise than as terminals. A standard freight car, wastefully idle now twenty-two hours out of twenty-four, will be multiplied in efficiency many times. The 40,000 miles of trolley tracks and the 600-odd short line steam roads will salvage their capital accounts and serve as the very best new feeders and distributors to steam trunk lines and to electric roads as well. The truck will have a correspondingly enlarged field of usefulness and income revenue and can be in mobile action during the twenty-four hours of a day, if necessary. With the ton-mileage of the rail multiplied and the highway ton-mile lessened the life of streets and roads will be prolonged. The trouble with the railroads in the past has been that in addition to furnishing transportation (which is their business) they have furnished warehousing (which is not their business), and such warehousing has grown so big that it chokes their terminals, ties up their cars and cripples their systems. A standard freight car is at its full value only when it is on the move. As handicapped and conditioned in the year 1919 it earned a gross average of only $2.25 per day.

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*See also ELECTRIC RAILWAY JOURNAL for Oct. 12, 1918, page 658.

With scientific use of the new auxiliary "through container" neither the standard rail vehicles, steam or electric, or the standard highway vehicle, animal or motor, will be crowded from rightful prerogative. Each will still get all the business it goes after and can execute with profit.

Edward Hungerford, a popular writer on utility topics, also addressed the club. He stated that the salvation of the railroads is dependent on the farsightedness or vision of those now in control as to how the railroads will function in the future. He referred especially to freight terminal facilities, and to the Cincinnati plan, under which, by the use of fifteen special motor-truck chassis and 200 wooden containers, costing only $400 each, the speed with which freight was transferred from one terminal to another was so increased that some 66,000 freight cars were returned to interline service, and in addition a further saving of from $1,000 to $1,500 per day was made in freight-handling costs.

Mr. Hungerford expressed the belief that the use of such containers will grow and that many shippers in the near future will be using them in handling a large part of their shipments. It is impossible for the railroads to finance this new equipment, and unbelievable to think the government will do it, but there seems to be no reason why the necessary cars and containers cannot be built under a car trust and rented, the cars and motor chassis on a mileage basis and the containers on a per diem basis.

Advantages of Containers in Freight Traffic

AT THE New York Highway Transportation show held recently, F. W. Wenn, secretary motor truck committee of the National Automobile Chamber of Commerce, presented a paper on the use of the motor truck in relieving terminal congestion. In speaking of terminal losses due to congestion as it recently existed at the main distribution centers of the steam road terminals, he stated that if the junction and terminal delays could be eliminated the daily average freight car mileage could be brought up to 37.5 miles per car per day, equivalent to an addition of 1,200,000 cars.

The use of the motor truck with portable container bodies at these vital points—as in Cincinnati—would greatly increase the capacity of revenue produced at these terminals. In this system the freight, when unloaded from the railroad cars, is trucked to the container body, which has previously been carded for the proper distribution point. When loaded, these bodies are sealed, put under telephone order of a joint dispatcher employed by the railroads, and loaded mechanically onto trucks and then routed over the streets to destination. On arrival the container or body is mechanically unloaded and another loaded body put on the truck chassis for return delivery or to another point. This means of handling terminal freight in Cincinnati has reduced the cost of handling 35.2 cents per ton and has eliminated 300,000 switching movements annually. It has also proved that all widely distributed station facilities can be laced up as a unit without investment cost to the railroads, thereby giving to each the benefits of a union freight station. The speaker estimated that with such a system in effect in New York City, where 50,000 tons of freight are moved daily between the various terminals, a saving of $45,000,000 would be made annually.

Toronto Making Huge Investigation

IT IS probable that a large number of American electric railway companies have recently received blank questionnaire forms from the Toronto Transportation Commission. It appears that this commission is making an immense investigation which will enable it to study, as it says, "the changed conditions, as regards expense, value and revenues, which have taken place within the last six years." Companies are requested to furnish complete information for the year 1914, 1916, 1918 and 1920.

The form calls for almost every item of information which any one might wish to know about a railway. The following are some of the subjects upon which information is requested: Name of city, population, population served, route-miles both inside and outside of city, total miles of main track, passenger cars with details, car-miles, power consumption per car-mile, car seat-miles, passengers carried, revenue and transfer, passenger car-hours, passenger earnings, total earnings, operating expenses divided into transportation in detail, maintenance in detail, depreciation and renewals in detail, and upon each of the latter items the total amount and condition per cent at which property is maintained and rate and life allowed are asked; other subjects upon which information is desired are taxes and the investment and present cost of new track and substructure, overhead conduits, cars, carhouses, power equipment, powerhouse buildings, miscellaneous, and estimates of present cost are asked of 1 mile of double track, paved, on heavy traffic streets, exclusive of special work, and also upon 1 mile of overhead.

If replies to this questionnaire are received in any large number, the result will constitute material upon which can be based one of the most comprehensive reports and analyses, from a statistical standpoint, to which the electric railway industry has been subjected.

The A. S. M. E. Boiler Code

THE boiler code committee of the American Society of Mechanical Engineers and the National Board of Boiler Inspectors will meet in Detroit, Mich., Feb. 2 to 4, for the purpose of planning for a national system of boiler inspection and for an enlargement of the influences set in motion by the A. S. M. E. boiler code. The first edition of this code was printed in 1914. Four years later a revised edition was issued, incorporating interpretations of the rules formulated in response to questions asked during the interim.

As a standard for new construction, the code has been adopted with varying degrees of completeness by the boiler inspection departments of twenty-one states. The standard of Massachusetts, which has its own code, does not differ essentially from the A. S. M. E. code. The remaining states have no boiler inspection departments. Numerous cities provide by ordinance for boiler inspection and eleven cities have adopted the code.

Selling Trainmen Their Jobs

Pennsylvania Company Conducts a Campaign Among Its Workers and Attempts to Improve Working Conditions by Publishing Stories in the Press on Accidents and Accident Prevention

THE Beaver Valley Traction Company and the Pittsburgh & Beaver Street Railway, operating through the Beaver Valley, Pennsylvania, a short time ago conducted an earnest campaign among their employees to create a better pull-together spirit in the enforcement of the service code for employees issued by W. H. Boyce, general manager of both companies. Extracts from this code were published in the ELECTRIC RAILWAY JOURNAL, Sept. 6, 1919, page 503.

Codes are usually dull reading. This code, however, is the exception and a few paragraphs are reprinted herewith to prove it:

> The greatest *service* existing in your work is the *service* the passenger gives you. Funny, isn't it? True though. I said he paid your wages. That's mighty important to you—mine are to me, anyway. So, every *service* you can give the passenger will not be any more than he is entitled to—remember that.
>
> But few of the passengers consider you except in the way you serve them in their transportation needs. Do your duty by every one and when the day comes to a close you can in content spend the evening with the folks at home. Violate the rules and circulate your grouch and things won't be pleasant here nor at home.
>
> Let me tell you that the passengers are more valuable to us than you are. We cannot get along without the passengers. So, put in the background or shelve any idea you may have or had that you are the king pin. You are not—neither am I—the passenger is the important party. Don't forget it.
>
> You represent this company on the cars. From the stockholders down to the smallest official this company is clean, frank and has nothing to conceal. Representing the company, you will understand that cleanliness in person, appearance, language and mind is essential. While the company may be in financial straits, yet you receive your wages regularly. Nothing should prevent you from having well appearing uniforms. Pressing and cleaning will help in appearance. Soap and water is the best eliminator for dirt and germs on hands and face.

LETTERS AND BULLETINS SENT EMPLOYEES

To keep up the interest among the employees in good service and safety methods, letters accompanied by bulletins were sent by H. O. Allison, safety engineer, to the men at their homes asking for their co-operation in safety-first work and a pull-together spirit with company officials in their daily duties. The letters were personal and to the point, nevertheless they contained cautions regarding careless car operation on slippery rails, violation of the rules as to door operation with car in motion, proper starting and stopping of cars as a means of accident prevention, etc.

Several of these letters are reproduced, as well as the accompanying bulletins, and attention is called to the letter that defines "safety first." These definitions would bear repetition by others that are conducting safety first campaigns. The bulletins issued to the employees dealt with the same topics and pointed out that the interests of the men were identical with those of the company. Co-operation, they said can and will make success for both and nothing else will.

One bulletin outlined what the company wanted to do for the welfare of its employees if only given a chance.

Letter Number Four

Oct. 20, 1919.

MR. J. RUPPLE,
1015 Third Avenue,
New Brighton, Pa.

MY DEAR RUPPLE: We have heard a great deal lately of "safety first." How many have ever stopped to inquire what it means as applied to street railway employees?

Let us consider just what "safety first" means as applied to ourselves. This is an intensely personal matter and has to do with our every act, especially while in the discharge of our duties.

It means having a clean body and clear mind. No one who has in his care the life, limb and property of others can properly perform his duty unless he is mentally and physically sound. The car man's duties require a clear head, good eye and steady hand.

It means so to perform our duties that our own conscience will acquit us of all blame, should an accident occur. That we should know in our innermost selves that nothing we could have done would possibly have prevented the injury.

It means to depend upon no one else. To do, ourselves, all that lies in human power to prevent injury to the person or property of any one, be he ever so lowly.

It means looking out for the other fellow, looking out all the time, expecting him to do some careless thing.

It means ringing the gong and slowing the car on approaching street crossings and intersections.

It means looking out for children playing in the street; for feeble persons boarding your car; let them get seated before car is started.

It means starting your car carefully and feeding current correctly.

It means knowing that your passengers are safely on or off your car before "go-ahead" signal is given.

It means that the rules should be closely studied and carefully observed.

It means, last, that "safety first" must be first in your mind. That it must be continually in your thoughts and govern your every action where your fellow man is concerned.

IN ALL CASES OF DOUBT TAKE THE SAFE SIDE.

IT IS BETTER TO BE SAFE THAN SORRY.

Yours very truly,
Safety Engineer.

Approved:

____
Superintendent.

Letter Number Five

Oct. 20, 1919.

MR. F. E. THOMPSON,
R. F. D. No. 3,
Eastvale, Pa.

MY DEAR THOMPSON: In whatever line of work a man engages he should aim to become a master; not only do his services become more desirable as his efficiency increases, but the mere striving after a high standard of attainment makes the work itself interesting and attractive.

One of the aims of the railway employee who would become a master motorman should be to operate his car smoothly, carefully and safely at all times.

The motorman who runs his car smoothly does more than make travel pleasant as such operation represents safety.

To start a car by feeding current point by point, to bring it to a stop smoothly, mean not only smooth but safe running. On the other hand to attempt to give the car excessive speed at the start by feeding current three or four points at once, to bring it to a sudden stop by jamming brakes mean in many cases not only uncomfortable but unsafe travel.

When a car is started suddenly there is a probability of passengers being thrown to the floor of the car before reaching a seat or even after they are seated. Also by making the stop suddenly passengers on their way to the platform to alight are apt to be thrown.

Whenever a motorman runs on the principle that he will make his stop short not only is there danger of throwing passengers to the floor, but there is added risk that the motorman may miscalculate the distance in which he can bring his car to a stop and a collision with a vehicle or pedestrian is liable to occur.

Whenever a car is started or stopped with a jerk discomfort of passengers always and frequently accidents result. Do not then attempt to start your car at too high a speed, or endeavor to stop suddenly, except, of course, in case of emergency.

When following a vehicle do not crowd it too closely, but sound gong and keep car under control until you know you have attracted the driver's or chauffeur's attention. He may not know thst you are behind him and stop quickly or turn suddenly in front of you.

When following another car remember and keep 300 feet behind it as prescribed by rule. Always run your car smoothly when starting, when moving, and when coming to a stop.

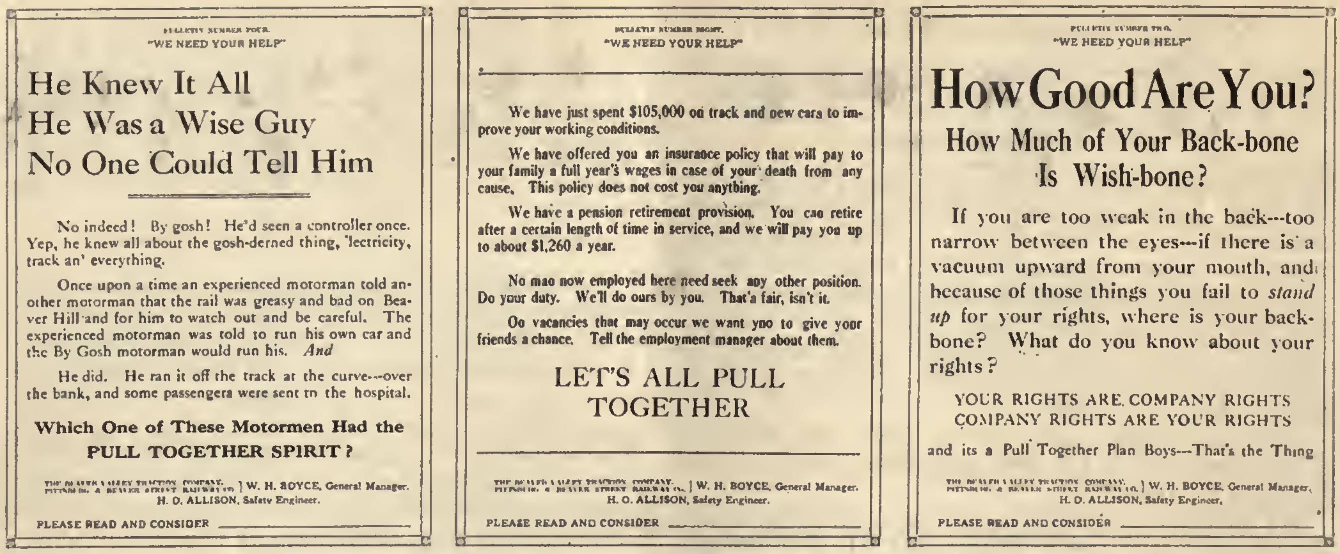
If you make your aim at smooth running true enough you will also hit the target of safe running.

Yours very truly,
Safety Engineer.

Approved:

____
Superintendent.

TYPES OF PERSONAL LETTERS ADDRESSED TO TRAINMEN AT THEIR HOMES



BULLETIN NUMBER FOUR.
"WE NEED YOUR HELP"

He Knew It All
He Was a Wise Guy
No One Could Tell Him

No indeed! By gosh! He'd seen a controller once. Yep, he knew all about the gosh-derned thing, 'lectricity, track an' everything.

Once upon a time an experienced motorman told another motorman that the rail was greasy and bad on Beaver Hill and for him to watch out and be careful. The experienced motorman was told to run his own car and the By Gosh motorman would run his. *And*

He did. He ran it off the track at the curve---over the bank, and some passengers were sent to the hospital.

Which One of These Motormen Had the PULL TOGETHER SPIRIT?

THE BEAVER VALLEY TRACTION COMPANY, PITTSBURGH & BEAVER STREET RAILWAY CO. } W. H. BOYCE, General Manager.
H. O. ALLISON, Safety Engineer.

PLEASE READ AND CONSIDER ______

BULLETIN NUMBER EIGHT.
"WE NEED YOUR HELP"

We have just spent $105,000 on track and new cars to improve your working conditions.

We have offered you an insurance policy that will pay to your family a full year's wages in case of your death from any cause. This policy does not cost you anything.

We have a pension retirement provision. You can retire after a certain length of time in service, and we will pay you up to about $1,260 a year.

No man now employed here need seek any other position. Do your duty. We'll do ours by you. That's fair, isn't it.

On vacancies that may occur we want you to give your friends a chance. Tell the employment manager about them.

LET'S ALL PULL
TOGETHER

THE BEAVER VALLEY TRACTION COMPANY, PITTSBURGH & BEAVER STREET RAILWAY CO. } W. H. BOYCE, General Manager.
H. O. ALLISON, Safety Engineer.

PLEASE READ AND CONSIDER ______

BULLETIN NUMBER TWO.
"WE NEED YOUR HELP"

How Good Are You?
How Much of Your Back-bone
Is Wish-bone?

If you are too weak in the back---too narrow between the eyes---if there is a vacuum upward from your mouth, and because of those things you fail to *stand up* for your rights, where is your backbone? What do you know about your rights?

YOUR RIGHTS ARE COMPANY RIGHTS
COMPANY RIGHTS ARE YOUR RIGHTS

and its a Pull Together Plan Boys---That's the Thing

THE BEAVER VALLEY TRACTION COMPANY, PITTSBURGH & BEAVER STREET RAILWAY CO. } W. H. BOYCE, General Manager.
H. O. ALLISON, Safety Engineer.

PLEASE READ AND CONSIDER ______

TYPES OF BULLETINS ENCLOSED WITH PERSONAL LETTERS

The pension scheme, which allows a maximum of $1,260 per year, was likewise given, all with the idea of pointing out that no man now employed need seek other employment. The bulletin further urged present employees to get their friends lined up with the employment manager for any vacancies that may occur in the present ranks.

The bulletins also brought out that the men on the cars represented the company in the eyes of the public and urged them to tidiness in their uniforms, saying: "It is not a slouchy company that you work for—dress right—and introduce your uniform to a flatiron once in a while." "Knockers," a bulletin says, "lose out, for they are not the kind of fellows wanted." "Satisfied workers are wanted"; those not satisfied are urged to move on unless they can go to the company officials and quietly tell the reasons. If that dissatisfaction cannot be wiped out the company is willing to advise as to the best next move.

NEWSPAPER CAMPAIGN ON ACCIDENT PREVENTION

As auxiliary to this campaign the company proceeded to improve the working conditions by conducting a safety campaign through the public press.

In November last Mr. Allison began a series of articles in each issue of the Beaver *Daily Times*. A story not too long to fail of being carefully read appeared daily under the caption, "Accidents and Accident Prevention." The series started out by reviewing the number of accidents fatal and otherwise in the United States and the State of Pennsylvania, then gets home to Beaver County, which had thirty-one fatalities during 1919, as well as 480 serious and 1,808 minor accidents reported to the Pennsylvania State Department. This record rates one person out of every forty-three in Beaver County as being injured during the year.

The series then takes up accident prevention, jay walking and safety work with school children and brings out that the cause of most children's accidents is carelessness and fear. Mr. Allison urges that the children be taught caution and safety—not fear—to walk rapidly, but not to run across streets, not to jay walk, but to follow the crosswalks, etc.

The series of articles also makes mention of the National Safety Council and outlines its scope and work. All forms of accidents, industrial, pedestrian, etc., are spoken of, as well as the traffic rules recently suggested by the United States Bureau of Standards, without making it too pointed that the railway company is really urging pedestrians and auto drivers to use caution and conserve human life.

Electrification of Staten Island Lines Proposed

Present Rapid Transit Facilities of Staten Island Analyzed and a Comprehensive Plan of Electrification Suggested —Tunnels to Brooklyn Will Soon Be Necessary, Connecting with Existing Rapid Transit Lines

AT A MEETING of the Brooklyn Engineers' Club held on Jan. 13, 1921, R. H. Mitchell read a report compiled by Randolph H. Nexsen, electrical engineer of the New York State Public Service Commission, on Staten Island transportation conditions and the proposed electrification of the rapid transit system. An abstract of this report follows:

The dual subway contracts now approaching completion provide certain rapid transit facilities for four of the five city boroughs according to the plans laid down in 1913. Until recently little or no future planning had been done, but with the development of a comprehensive rapid transit plan it is quite apparent that within a few years Richmond, the fifth borough of the city, will be provided with such facilities, probably by means of a tunnel under the Narrows connecting with the existing Fourth Avenue subway. Such a connection will bring both Brooklyn and Staten Island into closer connection with Manhattan.

Staten Island has an area of about 58 sq. miles and is third of the five city boroughs in size. Its greatest length is about 13 miles and its greatest width about 8 miles. In 1900 Staten Island had a population of 67,021; in 1910, 85,969; in 1915, 98,634, and in 1920, 116,531, or an average density of about 3.2 per acre. The average density of the city of New York is about thirty per acre. The greater part of the population lives on the north and east sections of the island. The south section is moderately settled, while the interior and west sections are sparsely populated.

Exterior means of communication consist of ferries with one exception, the Baltimore & Ohio Railroad

TABLE I—STATEN ISLAND'S FERRY FACILITIES

Line	Route	Distance Miles	Passengers Carried 1918	Passengers Carried 1919	Remarks
Municipal	St. George to Battery	5	17,561,801	19,579,271	Rush hour service, fifteen minutes. Other periods, twenty-thirty minutes
Brooklyn	St. George to Sixty-ninth Street, Bay Ridge, Brooklyn	1.69	495,972*	970,384*	Not operated during winter
Tottenville	Tottenville to Perth Amboy, N. J.	0.5	1,206,251	1,314,395	....
Linoleumville	Linoleumville to Cartaret, N. J.	0.19	....	....	Summer months only
Holland Hook	Holland Hook to Elizabethport, N. J.	0.16	625,554	628,898	....
Port Richmond	Port Richmond to Bergen Point, N. J	0.26	1,072,312	1,136,262	....

*Nine months

bridge at Perth Amboy, at present used for freight service only.

There are three electric street railway systems operated on the island: Those of the Richmond Light & Railroad Company, 17.29 route miles; the Staten Island Midland Railway, 16.18 route miles, and the Southfield Beach Railroad, 1.57 route miles. The street railways parallel the rapid transit lines for most of their length and also serve a considerable portion of the interior of the island. The rapid transit passenger service is furnished over 23.5 route miles of double-track steam railroad which is also used for freight service; the lines of the Staten Island Rapid Transit Company, 20.81 route miles, and the lines of the Staten Island Railway, 12.65 route miles.

A conservative estimate indicates that 75 per cent of the working population of Staten Island is engaged in business in Manhattan or Brooklyn, most of which is carried on the Municipal Ferry.

The Staten Island Rapid Transit lines carried 4,600,273 passengers in 1914 and 9,269,902 in 1918, an increase of more than 100 per cent in four years. Under present conditions service seems to be adequate, but during the rush hours an increase is desirable. At present the companies have not a sufficient equipment materially to increase this service and there is also the difficulty resulting from the derangement of passenger schedule due to freight movement.

If serious consideration is to be given to a comprehensive self-contained rapid transit system for Staten Island under existing conditions, the following steps are necessary:

1. An interborough connection, by tunnel or other means, with Brooklyn or Manhattan, preferably Brooklyn, to connect with existing rapid transit city lines.
2. The electrification of the existing rapid transit lines on Staten Island.
3. Additional tracks to be provided on the North and East Shore Divisions of the existing lines.
4. The elimination of grade crossings when additional tracks are provided on the North and East Shore Divisions.
5. The construction of a new terminal at St. George.
6. The construction of a line between Tottenville and Arlington on the west shore and the development of belt-line operation.
7. The extension of trolley or bus lines into the center of the island to act as feeders to the completed belt line system.
8. The construction of a mid-island rapid transit line in a general southwesterly direction from Tompkinsville.

Assuming that the Narrows tunnel as planned and approved by the Public Service Commission in 1912 was constructed and the Staten Island rapid transit lines electrified, a connection would then be provided to Bay Ridge, Brooklyn, and the Fourth Avenue subway. Such a connection would immediately give those within reach of Staten Island lines access to the business sections of Manhattan and Brooklyn. The express schedule from St. George would be about thirty minutes to the Municipal Building.

In making any comparison it must be kept in mind that the headway would be shorter, the fare would not be so high as the combined railroad and ferry fares, there would be no delays due to water-borne traffic such as are now encountered by the ferries, the running time would compare favorably with that for similar distances on existing rapid transit lines and there would not be the long transfer from the Staten Island rapid transit lines to the ferry. The fare from most stations on the Staten Island rapid transit lines would have to be about 10 cents.

In the construction of any tunnel to connect with the Fourth Avenue subway, the growth of Bay Ridge and other sections must be borne in mind, as this subway is fast approaching its limit of capacity. The introduction of the Staten Island traffic may overload it and postpone this connection until a new subway connecting Brooklyn and Manhattan could be built.

It has been assumed that a maximum of eighty-five or ninety cars operated in multiple-unit trains will be necessary after electrification, as there will probably be an increase in traffic. To handle this increase the car equipment proposed is similar to that of the New York Consolidated Railroad, which has a seating capacity of ninety. This type of equipment has been selected because, at some future time, a physical connection will probably be had by the New York Consolidated Railroad with the roads of Staten Island, and an operating agreement would be to the mutual benefit of both companies, as well as to the traveling public and the city of New York. In general, the physical characteristics of electrical equipment are such that joint operation and the interchange of equipment and power would be possible. Based upon the above condition, the use of 650-volt direct current has been considered. This current is to be taken from a covered third rail supplied from synchronous converter substations, which are tied in with a three-phase 11,000-volt, alternating-current transmission system.

Mr. Nexsen has prepared three estimates, one of $13,338,662, covering the complete electrification of the existing Staten Island rapid transit lines; another, including the necessary items of electrification, except that power is purchased, of $8,380,247; and the other, the proposed construction and electrification of the West Shore connection between Arlington and Tottenville, of $3,947,636. It is his opinion, also, that very much improved service for the same operating expense will result from electrical rather than steam operation and such betterment of service would almost surely result in a rapid acceleration in population growth on Staten Island. This growth would, in turn, make possible increased revenue for the company and better service for the traveling public, to say nothing of the increase in property values.

Opinions Regarding Endorsement by the Association of Reports of Federal Electric Railways Commission and of Chamber of Commerce Committee

Railway Executives and Public Service Commission Members Discuss the Pros and Cons of Action by the Association — A Practical Demonstration of Co-operation, Says One—Action Will Be Disclosure of Average Local Conditions, Says Another

THE question of endorsing, or taking some action with reference to, the reports of the Federal Electric Railways Commission and of the special committee of the Chamber of Commerce United States will be considered at the mid-year conference at Chicago, following President Gadsden's recommendation.

That this is an important move is generally admitted. Believing that comments from several viewpoints would assist in crystallizing opinion on this subject the editors of the ELECTRIC RAILWAY JOURNAL *have sought opinion from the field.*

General Guy E. Tripp, chairman of the Board of Directors of the Westinghouse Electric & Manufacturing Company and chairman of the Committee of One Hundred, was asked to give his views. He said:

"The suggestion that the American Electric Railway Association should place itself on record regarding the report of the Federal Electric Railways Commission and the report of the special committee of the Chamber of Commerce of the United States makes the coming Chicago Mid-Winter Conference probably as important a meeting as the association has ever held.

"The suggestion, of course, contemplates an endorsement of the reports in question because the association would hardly go on record as condemning them. The question really is then whether it is wise for the association to approve the principles laid down in these reports in a clear-cut and complete manner.

"There is no doubt that a very interesting discussion will result.

"There are undoubtedly electric railway companies whose troubles cannot be settled upon the principles laid down in these reports without serious results to their outstanding security obligations; for example, a settlement upon these principles might result in some companies being taken over by their bondholders and the capital stock rendered worthless. In these cases the stockholders are naturally endeavoring to find a basis of settlement which shall be fair to the public and which at the same time will not entirely wipe out their stockholdings.

"Such companies may think the proposed action by the association to be harmful to their plans.

"On the other hand, there are companies whose affairs, if adjusted upon the 'cost-of-service' and 'fair-valuation' principles, will be placed upon a sound and healthy basis. Such companies will naturally see a benefit to them in an endorsement of these principles by the association. However, even the latter may wish to have 'cost of service' more accurately defined and to bring forward some items not popularly envisaged which ought to be included in a 'fair valuation.'

"Each member of the association will doubtless feel that his own situation is controlled to a large extent by local conditions and that local conditions should have large weight in the application of general principles to the solution of his problem. Therefore, if action is taken upon these reports, it will be an illuminating disclosure of the average of local conditions in the electric railway field."

⁂

A. W. THOMPSON, *president of the Philadelphia Company, owners and operators of the Pittsburgh Railways, is another whose comment on this proposed action was requested. Writing under date of Jan. 24, 1921, Mr. Thompson presents his views as follows:*

"While perhaps not unreservedly in agreement with all the opinions and conclusions expressed in the Federal Electric Railways Commission report, I consider it a most important and constructive document upon which electric railway managements may base hopeful efforts to conduct their properties on a sound business foundation.

"In any such comprehensive report, however, there are of necessity some conclusions reached and some opinions expressed which will not harmonize with conditions everywhere, and consequently I doubt the wisdom of an unqualified endorsement of this report.

"The report shows the high ability and intelligence of the street railway and financial representatives on the board and the resultant recommendations more nearly meet the requirements of the situation than was hoped for. If the American Electric Railway Association endorses the report without qualification, however, it will practically become law for the industry. This would establish it in a position which it would seem it was not intended to fill.

"There are a number of principles firmly established on sound economics which are splendidly expressed and should be endorsed by all utility companies. To quote one: 'The first essential is service to the public.'

"In so far as the report follows this principle in accordance with sound business experience it should be endorsed, but it embodies some conclusions and opinions which may complicate the solution of utility problems in certain localities, not because of fundamental error in the principles on which the report is based, but due to a belief on the part of the public that an endorsement of the principles underlying the report carries with it an endorsement of all conclusions and opinions expressed. There would be no criticism of the value of the report in suggesting that it could not safely be endorsed in its entirety by the street railway industry officially. It would be simply a recognition of the inevitable human element in the commission, the public and our companies.

"With reference to the report of the Chamber of Commerce of the United States' committee on public utilities the scope of the report and the personnel of the committee were limited to the business element and so more nearly represent the viewpoint of private capital which we represent. The endorsement of this report would seem to me to be in order.

"I believe such informal discussion of these reports as your letter should induce will prove to be informative, and as an exchange of views cannot fail to be helpful. The opportunity to participate in it is appreciated."

* * *

RICHARD T. HIGGINS, *chairman of the Public Utilities Commission of Connecticut, who has been a student of electric railway problems and has appreciated the public's duty in this whole problem, as well as that of the railways, was asked for his opinion. Mr. Higgins' commission has recently made recommendations to the Legislature embodying many principles of the federal commission report. He said, with reference to action at Chicago:*

"Following important nation-wide investigations, reports, and recommendations pertaining to the street railway industry of the country, the mid-winter meeting of the American Electric Railway Association, to be held in Chicago, Feb. 10, should be one of the most important in the history of that association, and its deliberations will in a measure portend the future history of the industry.

"It is generally recognized and has been clearly demonstrated that the street railway industry as a whole has been and still is in a serious condition. It is confronted by obstacles which threaten its future continuity, efficiency and development. It is impossible to put a finger upon any one cause as the cause producing such condition, or upon any one remedy that will effect a permanent cure. We may be fairly familiar with cause and effect, but at this time we are vitally more interested in such proper remedy or remedies as will give life and vitality to this very important utility service.

"To my mind one of the most important factors in the resuscitation is honest co-operation between the utility and the public, without which all other remedies will have but partial effect. There is no railway or combination of railways as great or powerful as the public, and if the railway companies do not obtain the sympathy, good will and co-operation of the public which they undertake to serve, no amount of legislation or temporizing concessions will make the business a real success.

"Fair and impartial tribunals, principally the Federal Electric Railways Commission and the special committee of the Chamber of Commerce of the United States, have recently made careful study and investigation of street railway conditions, and have made concrete suggestions, not the least among them being co-operation. The investigations and reports of these tribunals reveal a commendable desire on the part of the public at this time to co-operate with and assist the utility.

"The proffered assistance and co-operation on the part of the public will undoubtedly be demonstrated by the early enactment of remedial legislation, which should afford at least a measure of relief. Mutual assistance and co-operation, however, cannot from their very nature be onesided. The utility companies themselves must join and should join whole-heartedly in the campaign.

"I believe a practical demonstration of such co-operation on the part of the utility should be developed and crystallized at the forthcoming meeting of the association.

"I do not wish to imply that co-operation is the only thing necessary, but, as stated before, I believe it to be one of the most important links in the chain of practical remedies intended for the benefit and preservation of this necessary public service."

* * *

FROM *Minneapolis, Horce Lowry, president of the Twin City Rapid Transit Company, writes as follows in answer to a request for his comments on this question:*

"With reference to my own feeling in regard to the report of the Federal Electric Railways Commission, would state that I believe that this report is one of the best things that has happened in recent years for the interest of the industry.

"My particular reason for stating this is that both this report and the report of the committee on public utilities regarding local transportation of the United States Chamber of Commerce are reports written by men a majority of whom have no direct financial interest in street railway properties, and for this reason their conclusions carry weight where statements from active railway executives are generally discounted by the public."

ELECTRIC RAILWAY PUBLICITY

Devoted to How to Tell the Story

Railway Advertises City

THE Tacoma Railway & Power Company and its associated companies announced on Dec. 24 a very substantial evidence of its appreciation of the spirit of co-operation shown to it during the last year by the city of Tacoma, its officers, civic associations, business men and citizens generally. This was an arrangement by which the advantages of the city will be advertised twice a week during the coming year in one of the New York daily papers. The announcement, which was published in the Tacoma papers on the day before Christmas, read:

> As an expression of our genuine appreciation of the increasing spirit of fairness and co-operation shown toward us during the last year by the city of Tacoma, its officers, civic associations, business men and citizens generally, and as evidence of our mutual interest in this community's vigor and expansion, we have arranged with one of the most widely read daily papers in the United States, the New York *Times*, to run a two-line advertisement on the front page twice each week for a year, calling attention to Tacoma and its many business and commercial advantages.
>
> It is with a feeling of confidence and optimism for Tacoma's future that we are extending to one and all our best wishes for a Merry Christmas and a Happy New Year.

The idea, which is that of Richard T. Sullivan, general manager of the Tacoma Railway & Power Company, has received general commendation by the Tacoma papers. The *News-Tribune* says: "It is a new and novel conception of a public utility's duty toward the city in which it operates," and the *Ledger* says that "It is bound to be of material benefit to the progress of the community." Mr. Sullivan in a public interview said:

"The idea of the public utility concern doing some directly helpful thing for the city other than the indirect benefit of giving transportation is somewhat unusual and rather original. While there will undoubtedly be differences between the public and the street railway in future, the fact that the company has shown substantial appreciation for fair and honest co-operation in the past will in a measure warrant such treatment in the future."

Safety First Alphabet

NOTE—This alphabet was originated by the United Railways & Electric Company of Baltimore and used successfully in a recent "Safety First" campaign among the public schools.—EDITORS.

A is for Accident,
Which you may meet
If you are careless
Crossing the street.

B is for Best,
And it's best to take care
To see you are safe
When you go anywhere

C is for Children,
And wise children play
Upon the pavement,
Out of harm's way.

D is for Doubtful.
It's doubtful if we
Would ever get hurt
If careful we'd be.

E is for Ears,
As well as for Eyes.
Use both for protection
If you are wise.

F is for Foolish,
And foolish is he
Who thinks not of safety
When safe he can be.

G is for Gong,
That the motorman rings.
"Heed me and be safe,"
It constantly sings.

H is for Hurry,
The brother of Harm.
You'd better go slow
Than lose leg or arm.

I is for Injury
You will invite
If you're not careful
When you alight.

J is for January,
Beginning the year.
To make it real happy
From danger keep clear.

K is for Knowledge
Or that which we know.
We should know to be careful
Wherever we go.

L is for Lookout
To see where we are,
And not to go running
In front of a car.

M is for Mindful
Of danger around.
So always be careful
Wherever you're bound.

N is for Neglect
Of safety advice.
Beware then, and let
This warning suffice.

O is for Only.
There's only one way
To keep out of harm—
Be alert all the day.

P is for Patience.
We'd better not go
With a rush and invite
Suffering and woe.

Q is for Queer.
It often seems queer,
People rush into danger
Without any fear.

R is for Railway,
Doing its best
To keep you from harm.
Won't you do the rest?

S is for Safety;
Be on the safe side.
Let care be our motto,
And caution our guide.

T is for trouble
Carelessness brings.
When you are careful
Danger takes wings.

U is for Useful
And useful advice.
If you ignore it
You must pay the price.

V is for Victim
Of unseemly haste.
Have a care; watch your step
And no time will you waste.

W is for Women.
They should alight
Holding with left hand—
Not with the right.

X is for Xtra
(If that you'll allow),
So be Xtra careful
Forever—and Now.

Y is for Young folks,
Who sometimes forget.
Be careful and you will
Have naught to regret.

Z is for Zealous.
Be zealous in care
To keep out of danger
That lurks everywhere.

London Illustrated Booklets

IN LINE with its forward-looking policy of "merchandising transportation" by informing the public and visitors about various things which may be seen on or near the lines of the London General Omnibus Company, the company has issued a series of illustrated booklets, of which those listed below are samples. These booklets show characteristic scenes or views and accompanying these are interesting descriptions of walking tours or sightseeing trips which can be taken from certain stations on the routes. The booklets are actually very instructive and illuminating to a person who has no opportunity to take the trips, but who may be interested in some of the subjects mentioned.

EXAMPLE OF BOOKLETS DISTRIBUTED BY LONDON GENERAL OMNIBUS COMPANY

The following are some of the booklets issued:

"The Dorking Country," with twelve illustrations and descriptions of parts of the Dorking country.

"Little Histories." Some notes on the towns and villages near London, with 144 original photographs.

"Little Walks." Some rambles in the country around London, illustrated with 144 photographs.

"The Pilgrim's Way in East Surrey." Illustrated with thirteen original photographs and with sketch maps.

"Epping Forest." Illustrated with thirteen original photographs and a map.

"The Public Gardens of London." A new account of the gardens of the metropolis illustrated with fourteen original photographs.

"Memorials of London, No. 1—Naval and Military." Illustrated with fourteen original photographs.

"Memorials of London, No. 2—Artists and Craftsmen." Illustrated with thirty-four original photographs.

"Hospitals and Almshouses of London." Illustrated with fourteen original photographs.

The company evidently believes this pays, from its continued program of this sort.

Modern Trend in Publicity

MYLES B. LAMBERT reviews the railway situation, particularly the publicity situation, in the January issue of the *Electric Journal* and declares the one biggest nut to crack is that of securing the good will of the public and its representatives. On the need for publicity he says:

> Practically all railway executives are alive to the potent force of this abstract thing which we call "publicity." In the past many thought it consisted very largely in having one man write copy for use in the papers or in pamphlets. But they know now that it is a very much bigger thing—a sort of phantom giant force that is susceptible of direction and guidance and, when properly guided, it is capable of producing remarkable results. It becomes really active only when every executive and subordinate officer is thoroughly imbued with the spirit of the game, and then only when it is the job of some strong staff officer or headed up by a manager of public relations, with a staff of copy writers.

If the Farmers, Why Not the Railways?

IT WAS recently announced in Chicago by the secretary of the National Dairy Association that there is now a plan for a nation-wide moving picture educational campaign through which it is hoped to bring the city and the farm closer together and thus solve many of the problems now confronting the farmers of the country.

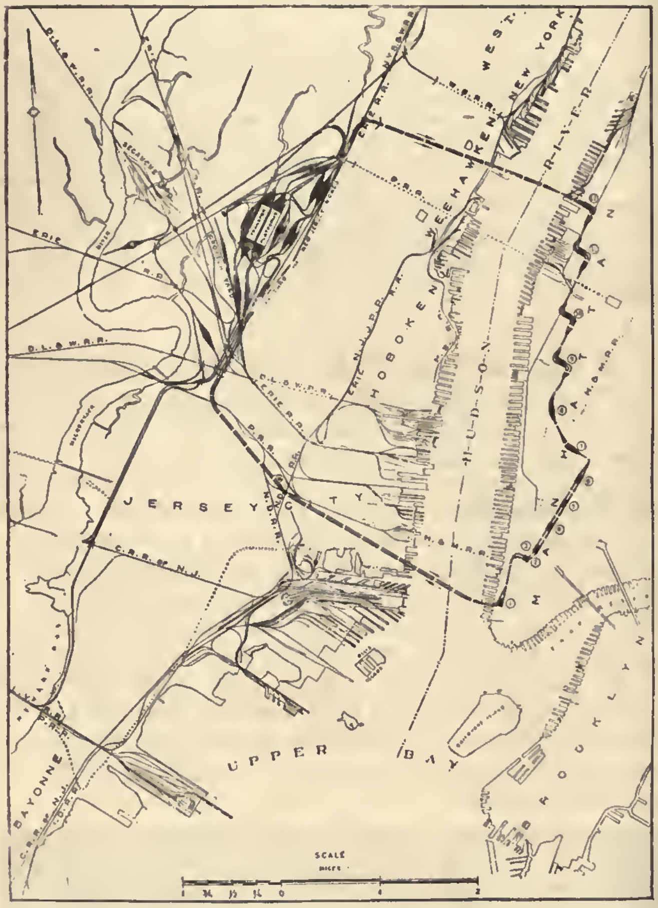
For this purpose, according to the announcement, the Farmers' Film Corporation has been formed and co-operating with it in the work will be the Federal Department of Agriculture, State Departments of Agriculture and state agricultural colleges, the American Farm Bureau Association, the National Dairy Association, the American Bankers' Association, Grange movements, and co-operative buying and marketing associations throughout the country.

LONDON UNDERGROUND "CHARACTER" POSTERS

Electric Trains to Cut Terminal Costs

New York-New Jersey Harbor Development Commission Proposes to Solve Port Congestion by More Extensive Use of Belt Line Railroad Facilities with Tunnels and Automatic Electric Trains

A SYSTEM of outer and inner belt lines to bring direct rail connections to the greater part of the water front of New York Harbor and a plan for building an underground "automatic-electric" freight subway loop system for distribution on Manhattan Island are the principal features of the physical plan for the solution of the New York port problem proposed in the report of the New York-New Jersey Port and Harbor Development Commission addressed to the governors of the two states, Dec. 16, 1920, and made public Jan. 24, 1920. In addition the plan proposes belt line links in New Jersey, Brooklyn, Queens, Staten Island and the Bronx.



MAP SHOWING INITIAL DEVELOPMENT OF PROPOSED UNDERGROUND ELECTRIC FREIGHT RAILWAY

In Manhattan, the commission finds that neither a standard underground nor overhead railroad is feasible for distribution and therefore proposes an underground "automatic-electric" system. This is an entirely new form of conveyor railroad, built below two subway levels, which, serving the nine New Jersey trunk lines as well as the New York roads, will carry freight on short trains with special cars, moving without locomotives or train operators, and running between twelve distributing terminal points in Manhattan and the joint yards in New Jersey and toward the upper end of Manhattan Island.

The first stage of the "automatic-electric" development in Manhattan is indicated in the accompanying map. It provides for linking the New York Central Railroad with the New Jersey railroads through a loop from a joint yard in New Jersey and a spur to the New York Central's Sixth Street yard, to "do away with the surface tracks in Tenth and Eleventh Avenues" and provide equal service for each of the ten railroads at twelve union terminals in the lower section of Manhattan.

The commission describes the "automatic-electric" system as a joint railroad where incoming freight is transferred at extensive platforms to trail trucks and hauled by tractors upon special cars. The cars, operated singly in the yard, would be made up into eight-car trains, dispatched on either of two parallel tracks leading to Manhattan. Here there are twelve terminal distributing points, with manufacturing and warehouse floors above, with approach sidings underground. When a dispatcher at the joint yard throws an electric switch the eight-car train would start automatically; speed up to 14 miles per hour and run to the desired terminal, on the approach siding of which it would automatically come to rest. Return trains would start from forwarding sidings at the terminals, when a switch is thrown, and then proceed to the joint yard and come to rest.

Cars then proceed singly, manually controlled, to transfer platforms, their trucks bearing outbound freight are removed and they receive new inbound loads and continue in the cycle. Elevators handle individual cars from the "main line level" to the outbound and inbound terminal floors, where loads are discharged and new loads received.

The estimated cost of the automatic-electric railway with its tunnels, classification yards and terminals is approximately $200,000,000, of which the cost of the necessary tunnels is $91,000,000, rolling stock equipment $9,452,200, electrical installation $13,600,000, Manhattan terminals $60,000,000 and the balance to be used for steam road classification yards and connections in New Jersey.

The cost of handling freight on a per ton basis the commission estimates is 43 cents less than with the system now in use. This saving will not only pay a return of 5 per cent on the investment but will even then be 19 per cent less than the present cost of terminal operations covered in the railroad rate.

New International Association Formed

AT A MEETING in Nuremberg on Nov. 28 to Dec. 1 of the German Street Railway Association plans were completed for the organization of a new international association of street and interurban railways to include the companies in Central Europe, evidently in opposition to the existing international association. Representatives from Denmark, Germany, German-Bohemia, German-Austria, Finland, Holland, Norway, Sweden, Switzerland and Hungary took part in the meeting and these countries will be embraced by the newly formed association.

The president of the society is L. Spängler, director of the Municipal Railway in Vienna, and the vice-president is Dr. Wussow, general manager of the Berlin Street Car System. The board is composed of one representative from each of the countries which are concerned.

Sample Car Tried in San Francisco

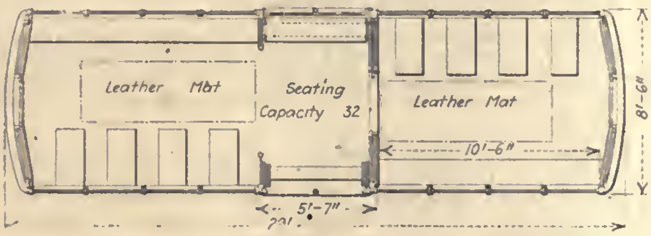
Center-Entrance, Single-Truck Experimental Car for Union Street Line of Municipal Railway in San Francisco Being Tested to Determine Its Suitability for the Severe Service Requirements

FOURTEEN per cent grades with sharp curves and fairly heavy traffic, all of which obtain on the Union Street line of the Municipal Railway in San Francisco, were believed to call for something far enough removed from standard practice to warrant the construction of an experimental car before the placing of an order for twenty cars which it is estimated will ultimately be needed to maintain adequate service on this line. A single car which was accordingly built to designs prepared by the city has just been delivered. It is to be put in actual service on the Union Street line and operated until city officials are satisfied that its design is correct, or until the advantage of any changes in design have been worked out and demonstrated in actual service.

The car is 29 ft. long over all and weighs, ready for service, 25,625 lb. It has a seating capacity of thirty-two and will handle from fifty-five to sixty passengers when all standing room is taken. The construction costs were high on a special order of this sort, of course. The total cost, exclusive of development charges, was about $15,000.

It is equipped with a 12-ft. wheelbase radiax Brill truck on 26-in. wheels, and has two Westinghouse 532-A motors, rated at 50 hp., with a gear ratio of 15:57. The underframe is all steel and the body semi-steel; that is, all steel except posts, floor and roof, which are of wood.

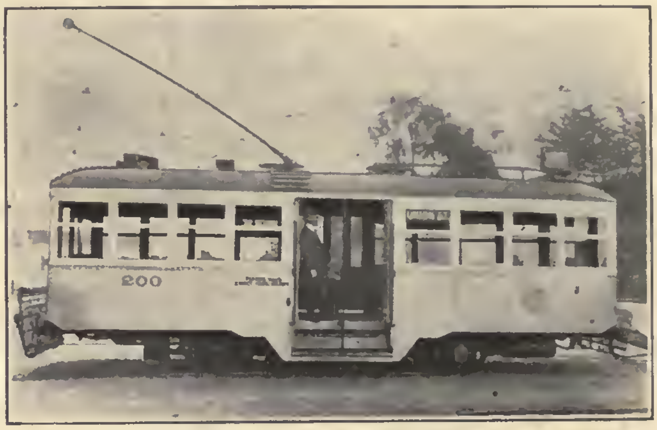
The light cars now operating on the Union Street line are equipped with manually operated track and wheel brakes. It was the purpose, in the design of the new car, to furnish air brakes for normal service and manual track brakes for emergency use, either of which must be able to hold on the steepest grade. Although the track brakes are satisfactory on the old cars, with a 7-ft. wheelbase, the 12-ft. base of the new car was so much longer that the shoes of track brakes require more than twice as much travel in order to avoid interference at the sharp changes of grade. This necessitated a greater throw for the hand lever than it was possible to secure. The air-brake equipment on the new car is therefore being supplemented with a geared brake of the multiplying type operated by a ratchet hand lever.



SEATING PLAN OF NEW CAR

The controller is the K-36-M General Electric type, in connection with which is used a Westinghouse 264-M-15 line switch operating as a remote-controlled contactor and breaker, the 600-volt circuit being actually broken under the car and not in the motorman's controller. This plan was deemed necessary because of the relatively heavy currents employed over portions of the route, and where a panic among the passengers on the steep hill might be very disastrous.

The roof of the car is made up of waterproofed three-ply wood, glued together like veneer, and shaped in process of manufacture to the roof curve specified. Full-width sections of the roof were made in 6-ft. lengths and were nested for shipment from the factory at Chicago to San Francisco. As there is no headlining the underside of this composite roofing is exposed and painted to form the ceiling, while the top is given a slush coat of white lead and then covered with roof canvas according to standard practice. A feature of the car frame, which is believed materially to strengthen it, is the 4-in. steel I-beam which runs from end to end of the car on either side. It passes just inside the riser of the top step at the car entrance.



NEW CAR READY FOR SERVICE

One end of the car is partitioned off from the conductor's vestibule and is intended for use as a smoking compartment. So far as possible it has been the purpose to keep all equipment provided with the car, such as headlights, fenders, etc., the same as the standard now in use on the larger municipal cars.

The new car was designed and constructed under the supervision of Paul J. Ost, electrical engineer, under the direction of M. M. O'Shaughnessy, city engineer. A. Meister & Sons Company of Sacramento, Cal., built the car under a contract the terms of which were actual cost plus a percentage.

Research Graduate Assistantships Open

THE Engineering Experiment Station of the University of Illinois, Urbana, Ill., directs attention to the research graduate assistantships which are maintained in the experiment station. With each of these there is an annual stipend of $600, with freedom from all fees for instruction except matriculation and a final fee.

Two new assistantships, in addition to the previous fourteen, have been established under the patronage of the Illinois Gas Association. The assistantships are open to graduates of approved American and foreign universities and technical schools, and must be accepted for two consecutive college years. At the end of this period, if all requirements have been met, the degree of Master of Science will be conferred.

The General Electric Company is proposing to sell stock to its employees on a basis which will allow them to pay for the stock on the installment plan.

American Association News

DETAILS OF CHICAGO CONFERENCE ARE NEARING COMPLETION—COMMITTEE WORK IS NOW IN FULL SWING—THIRTEENTH COMPANY SECTION IS ORGANIZED AT NEWARK, N. J.—ASSOCIATION'S REPRESENTATIVES ARE ACTIVE IN NATIONAL AFFAIRS

Power Distribution Committee Blocks Out Its Work

PRACTICALLY the entire membership of the Engineering Association committee on power distribution was on hand on Jan. 21 at association headquarters for the organization meeting. The list of members was printed in the issue of this paper for Jan. 15, page 147.

The first order of business was the subdivision of the assignments made by the executive committee among a number of subcommittees, as follows: Review of the overhead crossings specification, R. W. Eaton, chairman; F. McVittie and M. B. Rosevear; outline of specifications for catenary overhead construction, C. H. Jones, chairman; C. C. Beck, C. J. Hixson and W. Schaake; continue the study of standard stranding of cables, H. H. Febrey, chairman; A. Ames, A. Schlesinger and F. J. White; continue the study of standard specifications for wires and cables, F. J. White, chairman; A. Ames, H. H. Febrey, and C. A. Harrington; study the subject of composition of trolley wire and limits of economical wear, together with causes contributing to wear, M. B. Rosevear, chairman; C. C. Beck, R. W. Eaton and W. Schaake; report on the present status of direct-current lightning arresters in collaboration with the committee on equipment, F. McVittie, chairman; J. H. Drew, C. A. Harrington and C. J. Hixson; co-operate with the committee on way matters in regard to the preparation of specifications for wood preservation of power transmission poles, A. Schlesinger, chairman; J. H. Drew and C. H. Jones; revise existing specifications (other than those specifically provided for), C. J. Hixson, chairman; C. C. Beck, H. H. Febrey, C. R. Harte, C. H. Jones and M. B. Rosevear.

Contemporaneously with the meeting there was one of the subcommittee of the way and structures committee, having to do with timber preservation. During the session the subcommittee on wood preservation of the power distribution committee conferred with the other subcommittee and before the close of the meeting reported to the power distribution committee on a questionnaire which had been drawn up to secure information regarding results of applying preservative treatment to wood poles. The way and structure committeemen in attendance were H. H. George, Public Service Railway; W. R. Dunham, Jr., the Connecticut Company, and R. C. Cram, Brooklyn Rapid Transit Company.

The program followed during the all-day meeting of the power distribution committee was as follows: Each subcommittee outlined what it proposed to do in preparation of its report and received suggestions from the full committee as to policy and details. The list of topics given above furnishes an outline of this discussion.

The announcement was made that Mr. Harte will represent the association at the meeting of the American Engineering Standards Committee on Feb. 2. The association is now a member of this committee.

A message of congratulation and best wishes was ordered sent to C. L. Cadle, formerly chairman of the committee on power distribution, who was recently appointed Director of Public Works of the State of New York.

The announcement was made by Special Engineer J. W. Welsh that the American Institute of Electrical Engineers had been appointed by the American Engineering Standards Committee as sponsor in the preparation of specifications on conductivity of aluminum conductors.

The committee adjourned without setting a date for the next meeting.

Association Committee Appointments

The following Accountants' Association committees have been appointed:

Committee on Standard Classification of Accounts—H. L. Wilson, Boston (Mass.) Elevated Railway, chairman; W. H. Forse, Jr., Union Traction Company of Indiana, Anderson, Ind.; W. F. Ham, Washington Railways & Electric Company, Washington, D. C.; Robert N. Wallis, Fitchburg & Leominster Street Railway, Fitchburg, Mass.; P. S. Young, Public Service Railway, Newark, N. J.

Committee to Represent Accountants' Association at Convention of National Association of Railway and Utilities Commissioners—C. S. Mitchell, Pittsburgh (Pa.) Railways, chairman; B. W. Fernald, San Francisco-Oakland Terminal Railways, San Francisco, Cal.; John M. C. Horn, Illinois Traction System, Champaign, Ill.

CLAIMS ASSOCIATION

Below are given the Claims Association committee appointments for the current year:

Executive Committee—Past-presidents and present officers, together with the following: H. D. Briggs, Public Service Railway, Newark, N. J.; W. G. Fitzpatrick, Detroit (Mich.) United Railway; E. L. Lindemuth, Wilkes-Barre (Pa.) Railway; C. B. Proctor, Memphis (Tenn.) Street Railway.

Committee on Interchange of Claims Statistics—H. D. Briggs, Public Service Railway, Newark, N. J., chairman; J. S. Kubu, New York State Railways, Utica, N. Y.; W. F. Weh, Cleveland (Ohio) Railway.

Committee on Membership—C. G. Rice, Pittsburgh (Pa.) Railways, chairman; Wallace Muir, Kentucky Traction & Terminal Company, Lexington, Ky.; W. A. Tichenor, Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.

Committee on Resolutions—A. G. Jack, Wilmington & Philadelphia Traction Company, Chester, Pa., chairman; H. O. Allison, Beaver Valley Traction Company, New Brighton, Pa.; C. A. Glawson, Macon (Ga.) Railway & Light Company.

Committee on Safety—R. E. McDougall, New York & Harlem Railroad, New York, N. Y., chairman; H. K. Bennett, Eastern Massachusetts Street Railway, Boston, Mass.; H. V. Drown, Public Service Railway, Newark, N. J.; C. G. Rice, Pittsburgh (Pa.) Railways; W. F. Weh, Cleveland (Ohio) Railway.

Committee on Subjects—W. G. Fitzpatrick, Detroit (Mich.) United Railway, chairman; R. E. McDougall, New York & Harlem Railroad, New York, N. Y.; Wm. A. Tichenor, Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.; H. G. Winsor, Puget Sound Electric Railway, Tacoma, Wash.

Last Call for Chicago Conference

Electric Railway Finances to Be the General Subject for Discussion—Reports of the Federal Electric Railways Commission Are to Be Acted Upon—Prominent Speakers Will Address the Banquet

AT THE mid-year conference of the association, to be held at Hotel Drake, Chicago on Feb. 10, two vital subjects will be up for discussion, namely, electric railway financing and the essentiality of the electric railway. To cover the first-named topic in all its phases men who are well versed in its intricacies have been secured.

In addition to the presentation of papers on finance, definite action is to be taken on the recommendations contained in the report of the Federal Electric Railways Commission and in the report of the special committee of the United States Chamber of Commerce on the essentiality of the electric railways. No other utility has had, says President Gadsden, the advantage of two such thorough investigations by impartial bodies and the reports undoubtedly represent the opinion of the American public. Action will also be taken on an amendment to the by-laws of the association to provide for six additional members on the executive committee to be elected at large. It is proposed that these shall be elected to serve for one year and shall not be eligible for re-election for a period of one year from the end of their respective terms of office. The paper on previous methods of electric railway finance, by James F. Fogarty, secretary the North American Company, will summarize the changing methods of financing capital improvements, the influence of low rates of return on such methods, the holding company and its probable future as well as war and post-war financial methods.

The Conference

Thursday, February 10

THE DRAKE

President PHILIP H. GADSDEN, *Presiding*

MORNING SESSION

AT 9:30

REPORT—Committee on Constitution and By-Laws, Lucius S. Storrs, Chairman.

PAPERS—"Previous Methods of Electric Railway Finance," James F. Fogarty, secretary the North American Company, New York.

"Present Requirements for Mortgage Securities," F. K. Shrader, Halsey, Stuart & Company, Chicago.

"Home Town Financing — Partial Mutual Ownership," S. B. Way, vice-president and general manager the Milwaukee Electric Railway & Light Company, Milwaukee, Wis.

"Necessity of Financing by Sale of Capital Shares," Chester Corey, vice-president Harris Trust & Savings Bank, Chicago.

"Municipal Aid in Electric Railway Financing," Melvin A. Traylor, president First Trust & Savings Bank, Chicago.

AFTERNOON SESSION

AT 2

REPORT—Special Committee on Report of Federal Electric Railways Commission and Report of Special Committee on Public Utilities of the Chamber of Commerce of the United States. Walter A. Draper, Chairman.

GENERAL DISCUSSION

ADJOURNMENT

Mr. Fogarty has already contributed several important papers at other meetings of the association.

The paper by F. K. Shrader, Halsey, Stuart & Company, Chicago, will cover the present requirements for mortgage securities. He will discuss the relation of cash investment to the amount of the loan, the influence of previous history on electric railway investments, the margin of earnings needed over interest charges, the flexibility of mortgage provisions, the necessity of ample staple earnings as a condition precedent to the reestablishment of credit to be derived from service-at-cost franchises and the characteristics of bonds which the market is likely to absorb during the next year or two.

"Home-Town Financing or Partial Mutual Ownership" will be discussed by S. B. Way, vice-president and general manager Milwaukee Electric Railway & Light Company. Mr. Way, who has been with the Milwaukee company for many years, has successfully developed a plan of selling the securities of the local company at home. His paper will cover the desirability of having a large local interest held by the car riders, their influence on local regulatory ordinances, the cost of capital procurable by this means and the methods of distribution.

The necessity of financing by the sale of capital shares will be discussed by Chester Corey, vice-president Harris Trust & Savings Bank, Chicago. Mr. Corey's paper will take up the importance of providing for a return on new capital that will invite new investments and the methods of regulation that will support such plans of financing. The subject of municipal aid in electric railway financing will be presented by Melvin H. Traylor, president First Trust & Savings Bank, Chicago. This paper will define the conditions under which municipal cooperation is required, the establishment of moral support instead of using the street railway as a political issue, the pledge of municipal credit through guarantees and municipal aid for the construction of rapid transit subway and elevated lines. The annual banquet, over which President Philip H. Gadsden will preside, will be held as usual on the evening of the conference. He will also have an important message to deliver to the industry. The principal speaker will be Hon. John W. Weeks, former United States Senator from Massachusetts, and, according to rumor, a possibility for President-elect Harding's cabinet. Senator Weeks occupies a high position in the national life of the country and his broad knowledge of the problems that confront the industrial world qualify him to convey a message of great value.

Another speaker will be Hon. James H. Wilkerson, formerly chairman Illinois Public Utilities Commission. Mr. Wilkerson's activities have in one way or another been almost continually and vitally associated with public affairs. He recently resigned upon the inauguration of a governor elected on a platform which advocated the abolition of the state public utilities commission, and has since returned to law practice.

Charles A. Leedy, the widely known humorist of the Youngstown *Telegram*, will close the program.

Important Facts About the Mid-Winter Conference

HARRY L. BROWN, western editor ELECTRIC RAILWAY JOURNAL, who recently accepted the chairmanship of the committee on transportation for the Mid-Winter Conference, reports that it has so far succeeded in securing half-fare rate on the return trip for members coming to the conference from points in the Central and Western Association territories. The Southwestern Association will probably grant the same rate, and also the Trunk Line Association. Only 10 per cent reduction will be allowed for points on the Pacific Coast, and probably no reduction will be allowed in New England, Canada and the Southeastern States, but members from these sections can secure the lower rate part way by buying tickets to points in one of the territories granting special rates and buying new tickets from there on, following the same procedure in returning.

Final arrangements for the special dinner for the ladies in attendance at the annual banquet of the American Electric Railway Association in Chicago, Feb. 10, have been completed. The price of the dinner is to be $4 and tickets may be secured at the time of the meeting at the registration booth at the Drake.

Utilities Heard at Housing Conference

AT A HEARING called by the Chamber of Commerce of the United States in Washington on Jan. 28 on industrial housing, Philip H. Gadsden, president of the association, testified that the public utility companies of the country would require $852,000,000 to provide proper heat, light, telephone and transportation facilities for the 1,250,000 houses and apartments which the country now needs to help relieve the housing situation. This total is reached by combining the estimates of the most reliable authorities in the public utility field.

Hearing on Proposed Two-Cent Coin Legislation

AS THE RESULT of the appearance of a committee headed by Charles L. Henry, of the American Electric Railway Association, before the House Committee on Coinage, Weights and Measures, a study is to be made of the public need for a 2-cent coin before legislation to authorize its coinage will be pressed. An unusual privilege was granted to the committee of electric railway men in that an informal hearing was granted by the committee on the bill which already had been reported favorably to the House.

Representative Vestal, of Indiana, the chairman of the committee, stated after the hearing that his main idea is to authorize the making of a Roosevelt coin. He does not insist that it be a 2-cent piece. So far as he is concerned, a Roosevelt nickel would be just as satisfactory as a tribute to the late former president. Information has come to his committee, however, that there is public need for a 2-cent piece. Before taking any step to amend the present bill, he expects to investigate the extent of this alleged need. If it develops that there is no necessity or general desire for a 2-cent piece, he states that he will be very glad to propose an amendment making the coin one of standard size, so as not to work a hardship upon street railway and banking companies.

Mr. Henry and his committee pointed out that the proposed 2-cent piece would make necessary very heavy expenditures in altering fareboxes, coin counters and coinholders. The necessary alterations on a farebox would cost $20 each. In addition, electric railway companies would have to go to the expense of adding a barrel to each of the coin holders worn by the car conductors. The point also was made that there is a possibility of the proposed 2-cent coin making necessary alterations in all 25-cent gas meters.

In addition to Mr. Henry, the committee consisted of Matthew R. Boylan, Newark, N. J.; H. B. Flowers, Baltimore; J. H. Hanna, Washington, D. C., and P. S. Young, Newark, N. J. The committee was accompanied by representatives of the Johnson Farebox Company and the Brandt Manufacturing Company, makers of coin counters.

Camden Company Section Expeditiously Organized

ANOTHER company section has been added to the rolls of the American Electric Railway Association. This time it is on the southern division of the Public Service Railway. The section is the second on that property and its official name is the Camden Company Section of the Public Service Railway.

On Thursday, Jan. 13, an enthusiastic organization meeting took place in the assembly room at the Camden carhouse, and seventy-six charter members were enrolled. This number, however, does not include those who are already members of the Newark section and who are to ask for transfer to the new organization. With nearly 1,000 employees to draw from it is anticipated that the membership will grow rapidly and the work that is planned for accomplishment will become a factor of vital importance in the establishment of better public relations in the territory served.

In order that there might be a better and clearer understanding of the actual workings and aims of a company section three attachés of the association's home office were present and spoke. Secretary E. B. Burritt outlined the purposes and aims of the association work, explained where company sections fitted in and listed the benefits to be derived from membership. Special Engineer J. W. Welsh spoke on the magnitude of the industry, and Henry Surguy, editor of the association's monthly publication, *Aera*, explained the place that the magazine has in the association work. C. W. Stocks, of this paper, also made remarks on the value of co-operative effort and the advantages that can accrue to individuals through membership in company sections. Remarks were also made by Martin Schreiber, Robert A. MacArthur and H. C. Stevenson.

After the speakers had had their say the report of the nominating committee was received and the following were elected: President, C. V. Wallace, superintendent of employment; vice-president, W. H. Wright, superintendent of distribution; secretary, George Stoll, investigator employment department; treasurer, P. A. O'Connor, claim department; directors, William Kille, president of Local 880 of the Amalgamated Association of Street and Electric Railway Employees of America; Robert A. MacArthur, superintendent of transportation, and John Hanf, superintendent of equipment.

The new officers were then installed and a committee appointed to draft a constitution and to prepare a program for the next meeting, to be held on Feb. 10.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Dallas Wants New Deal

New Franchise Sought With Sliding Rate of Return Dependent on Fare

The city of Dallas, Tex., co-operating with the officials of the Dallas Railway, is framing a new franchise in response to the request of J. F. Strickland, president, and other officials. As noted in the ELECTRIC RAILWAY JOURNAL for Jan. 22, page 196, the company represented that it could not operate except at a loss under the present franchise and carry out the commitments made at the time the franchise was granted.

NEW FRANCHISE BEING FRAMED

A strictly service-at-cost franchise is wanted by the Dallas Railway in lieu of the present franchise, which authorizes a return of 7 per cent on the property valuation, provided the company can earn it. The franchise is being framed at conferences between the city officials and officers of the railway. The request for a new franchise was preceded by a petition for authority to raise fares from 6 cents to 7 cents. This request was peremptorily refused by the City Commission.

It is the opinion of those in the franchise conference that the adoption of amendments to the present grant embodying the desired changes will be preferable to the negotiation of a new franchise. An obstacle to the negotiations is the inability on the part of the company to raise the funds necessary for it to carry out certain improvements and betterments to which it is committed under terms of the franchise granted in 1917.

In order to provide an incentive for good management and to enable the company to attract capital for expansion Richard Meriwether, vice-president and general manager, presented a tentative sliding scale of fares and of permitted return, to be regulated automatically, as a stabilizing fund created for this purpose. The scale was divided into various steps which would permit the return to increase as the fare is lowered or to diminish as the fare is increased.

NEW FARE SCALE SUGGESTED

Step 1, based on a fare of 5 cents with the sale of tickets at seven for 25 cents, would permit the owners to receive a return of 8¾ per cent on their investment. Step 2, based on a 5-cent fare with six tickets for 25 cents, would permit a return of 8½ per cent. Step 3, based on a 5-cent fare with eleven tickts for 50 cents, would permit a return of 8¼ per cent. Step 4, based on a straight 5-cent fare, would permit a return of 8 per cent. Step 5, with a straight 6-cent fare as at present, would permit a return of 7¾ per cent. Step 6, based on a 7-cent fare with the sale of tickets at four for 25 cents, would permit a return of 7½ per cent, and step 7, the last shown, based on an 8-cent fare with the sale of tickets at two for 15 cents, would permit only a 7 per cent return.

In presenting the scale Mr. Meriwether said that it did not contemplate any change in the present free tranfer system.

State Regulation Proposed in Minnesota

Senators W. F. Brooks and Arch Coleman, Minneapolis, have introduced a bill in the Legislature to place regulation of electric railways in Minnesota in the hands of the State Railroad & Warehouse Commission. The rate-making power will be vested in that body if the bill carries, although full control of operation, service and improvements will be retained by the cities, subject to appeal to the commission when such orders would affect the cost of service. It is provided that electric railway franchises may be exchanged for indeterminate permits which are to continue as long as the railway affected obeys the law, or until the city or State shall buy the property. Either city or company may appeal to the courts against unsatisfactory rulings by the state commission.

A bill by Senator George H. Sullivan, Stillwater, places control of operation, routing of interurban lines and similar matters under the jurisdiction of the State Railroad & Warehouse Commission. Still another measure provides that the personal property taxes collected from electric railways shall be paid to the state.

The Council of St. Paul has passed a resolution condemning any action to put control of the local electric railway in the state commission.

In commenting on the Brooks-Coleman bill Horace Lowry, president of the Twin City Rapid Transit Company, said:

> Our position is that we feel that this bill should pass, as it is only by such legislation that it will be practically possible for our companies properly to serve the cities in which we operate.
>
> For the past four years we have endeavored in both cities to obtain modifications and extensions of our existing contracts, which would place the property on a sound financial basis but have been unable to do so, and in view of these facts we feel that placing the rate-making power in the hands of an impartial commission, and the extension of our right to operate, subject to good behavior or purchase, would give confidence to the investing public to the extent that we would be able to obtain the necessary funds to improve the property and provide adequate service.

Subsidy Suggested

Seattle Councilman Would Have City Dip Into General Fund for $1,500,000 to Help Municipal Line

An ordinance proposed by Councilman John E. Carroll, providing for the payment from the general fund of $1,500,000 yearly for the benefit of the Seattle (Wash.) Municipal Railway, has been introduced in the Council. No action will be taken on the matter, however, until Mayor Hugh M. Caldwell has completed his report on the municipal railway situation. The Mayor has so far opposed any such suggestions.

HELP FROM GENERAL FUND

The proposed action of delving into the general fund of the city would increase the tax levy by about 6 mills, it is estimated by City Comptroller Harry W. Carroll. The city, in transferring $203,909 to the city railway fund on Dec. 23, to provide funds for meeting the railway payroll, made its first inroad into the general fund, raised by taxation.

Redemption and interest payments due on street railway bonds in 1922 will total $1,705,550, the city comptroller states. A principal payment of $833,000 on the $15,000,000 in bonds issued to pay for the car lines is due on March 1, 1922, and $10,000 additional is the redemption payment due on $100,000 of bonds issued for divisions A and C of the city lines acquired before the Stone & Webster property was taken over. Interest due on revenue railway bonds in 1922 totals $926,800 and $35,750 more is due on general railway bonds. This makes the total amount of redemption and interest falling due in the year 1922 $1,705,550.

The interest rate on the $15,000,000 in utility bonds is 5 per cent. The interest is paid in semi-annual installments of $375,000. Three payments have already been made. Two interest payments will be due in 1921, the first on March 1, and the second on Sept. 1.

MAYOR'S REPORT AWAITED

The question of whether the railway tax ordinance, providing for payment of municipal railway operation expenses from the general fund, shall be submitted to the voters on March 8, has been discussed in the Council, but as stated previously, it has been decided to defer action on this point until the Mayor's report on the railway is received.

Councilman Bolton expressed the opinion in Council that the only solution of the question is for the city to get back to the 5-cent fare, and eliminate transfers.

Unified System with Single Fare Suggested

Chief Executive of New York in Special Message to Legislature Says Greater City's Transit Franchises Must Be Revised

Nathan L. Miller, Governor of New York, in a special message to the Legislature on Jan. 24 invited prompt consideration by members of that body of needed changes in the law for the regulation of public utilities. He said the most urgent condition was that presented by the transit situation in the city of New York. The Governor's view is that sufficient facts are known to enable the Legislature to determine what action it ought to take. He favors complete unified operation in New York City with a single fare.

THE Governor surveyed New York City's traction history, past and present, and condemned those who laid the foundations for ample fortunes by dishonest manipulation of traction securities as well as those who seek to benefit politically from the misdeeds of the early promoters. After reviewing the history of regulation in New York the Governor said:

There are now three agencies dealing with transit in New York City—the Public Service Commissioner, the Transit Construction Commissioner, and the Board of Estimate and Apportionment, and the powers of each are in dispute. It is not strange that an apparently hopeless tangle results.

With respect to surface lines an equally hopeless tangle of authority exists. It was obviously intended to confer upon the Public Service Commission complete regulatory power over them. But the Court of Appeals decided that it would not infer from the language of the act an intention to do that in cases where local consents had imposed conditions as to rates of fare. That decision, however, has been limited to such consents granted between 1875 and 1907. The result is that the Public Service Commission has jurisdiction over some lines and different sections of the same line and a divided authority with the Board of Estimate and Apportionment over other lines or sections of the same line. In consequence the transportation problem in the city of New York has steadily drifted toward disaster.

While the present drifting policy in a crisis daily becoming more distressingly acute is plainly due to the unwise division of authority and responsibility already referred to, the cause of the difficulty lies deeper. The present problem has a background of crooked financing, which now subjects it to popular distrust and prejudice easily aroused by the wiles of the demagogue. The time has come to protect it from the sinister designs of selfish financiers and politicians. It will not be difficult to eliminate the baneful influence of the former. The market value of outstanding securities is undoubtedly much below the intrinsic value of the properties represented.

UNIFIED SYSTEM ESSENTIAL

The ultimate solution of the problem must be maximum service with minimum cost for the benefit of the users of the public transportation facilities, the majority of whom have no other means of transportation. The public are now in a position to escape from the consequences of past misdeeds or mistakes if, instead of utilizing them for sinister purposes to breed disorder in the public mind, advantage is taken of the present opportunity to lay the solid foundations for a forward looking constructive policy.

In the past capital has been attracted too much by the chance of speculative profits. Necessarily those profits are made at the expense of the investor and the traveling public. Poor and costly service and loss to the innocent holder of securities are the inevitable results. Certainty of a fair return must be the attraction to capital in the future, and that, I am sure, the public will readily accord for adequate service.

The public are now in a state of mind to take nothing for granted. Their past experience has been such that they now will rightly insist upon being satisfied that the actual facts justify any measures adopted. Some agency, having public confidence, impartially to ascertain the facts and courageously to apply the remedy appears to be demanded to extricate the problem from its present difficulties.

I think it plain that the foundations should now be laid for a completely unified system of transportation in the City of New York, and I believe any open-minded person who studies the subject at all will be forced to that conclusion. The single-fare plan appears to me to be important to the future development of the city and the relief of congestion with its manifold problems, housing and the like.

Extensions should precede rather than lag behind demand. That means that profitable parts of the system must maintain the unprofitable. In order to give the public efficient and cheap service every possible economy in operation and management must be effected and every unnecessary duplication of service eliminated. Necessarily the subways will form the backbone of the system. The elevated, surface lines and buses will eventually be merely auxiliary. If, however, the most efficient service is to be rendered at the lowest cost competition must be eliminated and the particular service which is best suited to each particular situation must be adopted.

The foregoing and other considerations all point to one completely unified system, and if that premise be granted it necessarily leads to the conclusion that ultimately such a system must be municipally owned. That was settled when the city decided upon municipally owned subways. A unified system of operation will be difficult with both public and private ownership of ways and structures. Of course the ultimate result cannot be accomplished in a day. The time, however, is ripe to lay the foundations, and to lay them properly we must commandeer the services of men of proved ability, in whom must be vested all the authority that can constitutionally be given, and such men must be selected utterly regardless of politics.

The subways contracts three and four lay at the threshold of any solution of the problem. They must be revised if the problem is to be solved. I have not studied them sufficiently to assert with dogmatic assurance precisely how they should be revised and am only referring to the matter sufficiently to indicate the problem with which we have to deal. Experience has demonstrated that the provisions for preferential payments are unfair to the city. The people who ride in the subways do not realize that in addition to their fares they are paying to maintain $200,000,000 of subway bonds.

In my opinion the term of the leases is too long. That would not be so vital if the provision for recapture would not penalize the city in case it should exercise its option before the expiration of the term. That also would appear to need revision in the interest of the city.

LOOSE TALK ABOUT HOME RULE

Experience has already demonstrated the unwisdom of separating the regulatory powers of the Public Service Commissioner from the powers under the Rapid Transit Act now vested in the Transit Construction Commissioner. Increased expense and uncertainty of authority have resulted.

To my mind the conclusion is irresistible that the authority and responsibility to deal with this problem must be completely centered in some single agency. A Public Service Commission with all the power under the Rapid Transit Act and all the power necessary to deal with the problem, reserving to the city the power to give the constitutional consent to routes and, of course, to pledge the credit of the city, appears to me to be the manifest solution.

The vital thing to do at the moment is to create the agency to deal with the problem with ample and undivided authority and responsibility. That agency when created must work out a plan from the ascertained facts in the public interest.

There is a good deal of loose talk about home rule in connection with this subject. I believe in the greatest exercise of home rule, compatible with good government, but the public interest must always be kept paramount, and when state power can be effectively exercised only by the state it ought not to be delegated to municipalities.

The deplorable condition of transportation in the city of New York precludes the thought that either the Legislature or the Governor should evade or seek to shift their responsibility.

I recommend that all public utilities be placed under the jurisdiction of one state commission, except that a commission be created for the First District with complete jurisdiction over the single subject of transit in that district.

I recommend that a commission of three be created with complete jurisdiction over the subject of transit in the First District, that the powers under the Public Service Commissions Law and the Rapid Transit Act be transferred to it with such amendment as further study may suggest and that the former independence of municipal control be restored regardless of the provisions of local consents or prior contracts. I further recommend that jurisdiction over all other public utilities in the state be conferred on the present commission for the Second District. Five commissioners for that work may be necessary.

I also recommend that the Public Service Commissions Law be amended so as to make the rules uniform as to all public utilities, including the power to suspend rates pending a hearing and determination. In view of the time required for some rate determinations there should doubtless be power to prescribe temporary rates pending such determination, with such safeguards as may be prescribed by the commission, and complete power should expressly be vested in the commission regardless of local consents or contracts.

It is impossible to exaggerate the importance and the value to the people, if well done, of the work of the Public Service Commission. That body should be elevated to the dignity and the standing of a court and should be removed from political influence. If a commission of five is retained I recommend that the terms be so arranged as to expire at intervals of three years, the ultimate term of the commissioners to be appointed upon the expiration of the terms of the present incumbents to be fifteen years.

The commissioners should not be burdened with administration. Instead of increasing the appropriations for the department over $180,000, as is requested, I have no doubt that it will be found possible to effect decreases by more efficient organization. How that should be done I submit to your consideration.

Governors Indorse Utility Regulation

The Governor of Arkansas has made public thirty-eight statements from thirty-eight Governors indorsing state regulation of utilities. He asked forty-three Governors for their views, and learned that practically nowhere in American commonwealth leadership is their sentiment for abolition of the public utility commission system.

According to the messages received by Governor Brough from the Governors of these states, no state with a corporation or public utility commission would consider such a "backward step" as abolition of state regulation of utilities. Several point out that there has been some criticism of the law due to increases in rates made necessary by abnormally high operating costs in the last few years, but predict that the commissions will be found reducing rates as soon as conditions permit. The Governors all declare that state regulation is the best method of controlling the utilities and protecting the public.

Of the forty-three states heard from, thirty-eight indorse commission regulation; secretaries of two report the Governors away from home; while three Governors advise that their states are without commissions. One of these, Texas, will probably consider establishment of a utility commission at the current session of the Legislature.

Wages Reduced 25 Per Cent in Albany

Vice-President of United Traction Company, Following Unfavorable Decision in Rate Case, Announces Cut in Pay

Wages of the trainmen in the employ of the United Traction Company, Albany, N. Y., are to be reduced 25 per cent, effective Jan. 28. Announcement to this effect was made over the signature of H. B. Weatherwax, vice-president of the company, in a notice to the men made public on Jan. 24 but dated Jan. 22. The new fares, referred to elsewhere in this issue, and the reduced wage scale become effective the same day.

THE company at Albany has an agreement with the Amalgamated Association. Union officials at first refused to discuss the matter. Later it was announced that a conference would be held at once with officials of the Hudson Valley Railway, Glens Falls, included in the system of the United Traction Company, and that meetings of the Albany and Troy unions would be held on Jan. 29.

The proposed 25 per cent reduction brings the wages of employees back to the rate of 45 cents an hour in effect last June, but which was increased to 60 cents by an agreement July 1, 1920. This agreement was to expire Nov. 1, 1920, but was extended.

The statement of Mr. Weatherwax follows:

During the month of June, 1920, the representatives of the Amalgamated Association presented demands to this company for an increase in wages from 45 cents to 85 cents an hour (for motormen and conductors, other employees to be increased proportionately) to take effect July 1, 1920, at which time the wage and working agreement with the association then in force expired. The previous rates of wages, subject to overtime payments at the rate of time-and-one-half had been as follows:

July 1, 1914, to June 30, 1916, 28 cents an hour; July 1, 1916, to Jan. 31, 1918, 30 cents an hour; Feb. 1, 1918 to June 2, 1918, 31 cents an hour; June 3, 1918, to June 30, 1919, 40 cents an hour; July 1, 1919, to July 1, 1920, 45 cents an hour.

DEFICIT OF $420,671

At the time the demands were presented, the company had accumulated a deficit incurred as follows:

1915	$88,766
1916	14,077
1917	95,704
1918	132,734
1919	178,561
1920, 6 months	102,750
Total deficit	$612,594
Surplus, Jan. 1, 1915	191,923
Net deficit	$420,671

The great loss was incurred for the simple economic reason that the company's revenues had not kept pace with its expenses, which under war-time impetus, grew by leaps and bounds. Labor and materials doubled in cost, in some cases increasing to the extent of 500 per cent, resulting in the company paying out more than it took in, despite two increases in fares, first from 5 to 6 cents and again from 6 to 7 cents.

It was quite obvious, therefore, that it was clearly impossible to grant a wage increase in the face of such a loss unless additional revenue could be procured with which to pay it.

The company and the association through its representatives held conferences on the question of wages where the above situation was fully discussed, and it was finally agreed that wages for motormen and conductors should be advanced from 45 cents an hour to 60 cents an hour, an increase of 15 cents, and other employees increased correspondingly, retroactive to July 1, 1920, such rate to continue in force for a period of four months or to Nov. 1, 1920, pending a decision from the public service commission on our application for increased fare to meet the additional expense, and provided that if such increase was granted the rate of 60 cents would remain effective for one year from July 1, 1920. The wages of other employes, not members of the association, were also proportionately increased, making a total increase to the payroll of the company of approximately $50,000 a month.

Although such action meant additional loss and compelled the borrowing of money with which to meet the wage advance, the company felt the necessity of keeping the property in operation for a period reasonably long enough to enable the public officials to fix a just and reasonable rate of fare.

Soon after the wage question was settled as set forth above, on Sept. 7, 1920, this company presented to the Public Service Commission, a petition requesting an increase of fare, setting forth the necessity therefore and the commission set the date for the first hearing upon said petition on Oct. 14, at which time an adjournment was taken to Oct. 28 and another adjournment until Nov. 10 (both on motion of the cities), when the case was closed. The case not having been decided on Nov. 1, the company continued to pay such advanced wages, awaiting the action of the Public Service Commission.

Since July 1, 1920, the company has not earned even its operating expenses and the net profit and loss deficit which was then $420,671, has been increased so that on Dec. 31, 1920, the total profit and loss deficit had reached $747,927.

On Jan. 21 the Public Service Commission handed down a decision effective Jan. 29, reversing some of its previous findings and refusing to grant this company any increase in revenues and imposing changes in fares and conditions that we estimate will further decrease the gross revenues of the company by not less than $50,000 per annum.

Notice is, therefore, hereby given to all employees of the company, members of the association and otherwise, that the rates of wages provided in the agreement effective July 1, 1920, will be discontinued at midnight of Jan. 28 next, and the schedule of rates thereafter will be those in effect on June 30, 1920.

Service-at-Cost for Grand Rapids

Trial Period of One Year Proposed as Means of Testing New Measure with a View to Its Adoption Permanently

Grand Rapids is going to try the service-at-cost franchise for a period of one year as a means of solving its somewhat complicated electric railway situation, and if satisfied will enter into a long-time agreement with the Grand Rapids Railway upon the service-at-cost basis. This is the understanding that has been reached by the City Commission. A meeting was held on Jan. 19 at which the city officials went over very carefully details of service-at-cost franchises in Cleveland and other cities and the commission unanimously agreed to enter into such an arrangement with the railway if a basis of valuation could be agreed upon.

AT THE present time engineers are working upon a valuation of the physical properties of the Grand Rapids Railway. They are expected to report about Feb. 1. In the meantime Ganson Taggart, city attorney, is preparing a service-at-cost franchise and members of the commission are preparing for a joint meeting with the railway. So far this company has not spoken openly concerning the proposed franchise, but members of the commission say that it is agreeable to such a proposition.

Through technicalities in the city charter, Grand Rapids can not enter upon a trial contract with the railway for any definite period of time, and the city commission can not submit an issue such as a service-at-cost contract to an utility unless it sets forth a definite period, therefore the City Commission has agreed to put the trial contract in the form of a city ordinance and pass it without submitting it to the people. If it is found satisfactory then the people will be asked to vote upon a five-year or ten-year franchise with the service-at-cost features incorporated.

Preliminary discussions on the part of the City Commission show that it is desired to have the step-rate of fare from 5 to 10 cents with the rate of return ranging from 5 to 9 per cent on the agreed valuation. No board of arbitration feature will be included in the contract and neither will the city assume any jurisdiction over wages outside of a few department heads.

The city engineers in charge of the valuation work are making three valuations, historical, replacement and five-year average from 1914. The company's engineer, W. L. Hagenah, Chicago, is also getting a valuation on the same three bases. Meetings are now being held by the engineers to settle problems of depreciation. Intangibles are not being considered.

The franchise of the Grand Rapids Railway expires on April 23. At the present time the company is collecting an 8-cent cash fare, with fourteen tickets for $1. Two months ago it put into effect, at the request of the City Commission, a new routing providing for a downtown loop and stubbing of several lines serving the west side of the city. Since then west side residents have complained about the street cars traveling in tandem style to the terminals and returning the same way. A request is now before the commission asking for the repeal of this ordinance. The railway desires its repeal.

L. J. DeLamarter, general manager of the company, has submitted figures showing that during the three months under the new routing ordinance the car mileage has been increased 85,329 miles and that 437,332 fewer passengers have used the lines. The increased cost due to the increased car mileage has been $29,617.

The annual report of the railway submitted on Jan. 21 to the City Commission shows that during 1920 the lines were operated at a loss of $147,070. The loss during December, including fourteen days with an 8-cent fare, was $1,811.

End of Surface Cars in New York Predicted

Although They Carry Now 40 per Cent of All Passengers, Street Congestion May Force Them from Main Thoroughfares

In his report to the Legislature of New York John H. Delaney, Transit Construction Commissioner with jurisdiction in Greater New York, points out that the new transit plan advanced by him a few months ago takes into consideration the fact that vehicular and pedestrian traffic in New York City is increasing to such an extent that it will soon be regarded as inadvisable to continue surface car operation either on the main arteries of travel or on the main cross-streets of Manhattan Borough, and that passenger transportation at present handled on the surface will in the future have to be diverted to crosstown subway "tie-lines" operated on a moving platform device or shuttle cars, or by omnibuses.

BECAUSE of the fact that the congested section of Manhattan has only eleven north and south through traffic arteries to serve more than 150 cross-streets, Mr. Delaney says it will be necessary to resort to "double-deck" subway trunk lines in the central traffic arteries of the city that remain available for transit lines.

During the fiscal year ending June 30, 1920, says the report, there was an unprecedented increase in the traffic of the rapid transit and street car lines operating in the city of New York. The number of passengers in 1920 as compared with those of the preceding year were as follows:

	1920	1919
*Rapid transit railroads ...	1,424,166,581	1,204,266,664
Surface lines ..	940,608,486	875,676,340
Total	2,364,775,067	2,079,943,004
Increase	284,832,063	104,430,815

*Including Hudson & Manhattan tubes.

These figures disclose that there was an increase of approximately 220,000,000 passengers in the rapid transit traffic during the fiscal year just ended, of which all but 9,000,000 of the increase was carried in the subway and elevated lines, making up the Dual System in which the city has a large financial interest. Mr. Delaney said:

> With an annual increase in traffic exceeding 10 per cent it is obvious that provision must be made without delay for extension of local transit facilities for all sections of the city. When the Dual Contracts were signed in 1913 the rapid transit lines, carried 810,000,000 passengers for the twelve months immediately preceding the adoption of the new program. There has been an increase of approximately 615,000,000 passengers, or 76 per cent in the intervening seven years, and the new trunk lines are already showing congestion.

$350,000,000 NEEDED FOR NEW LINES

Intensive study has been made of the rapid transit needs of the future since the creation of the Transit Construction Commissioner's office and in August a report was made on a comprehensive plan intended to meet the requirements of the various boroughs of the city during the next twenty-five years. The plan was so laid out as to encourage municipal growth in every direction and to prevent abnormal and congested conditions in certain sections and strangulation of growth in other areas. As laid down it is intended that the transit plan and the general city plan for new thoroughfares and highway improvement shall be co-ordinated in order that the best results may accrue to the general public. The growth of traffic per annum has been constantly in excess of the annual per capita growth of the city.

The enlarged system as laid out to care for the city's needs during the next twenty-five years would provide for an annual traffic of 6,000,000,000 passengers. Projected lines and extensions to the existing lines, wherever they may originate in outlying boroughs are planned to enter and traverse the heart of the city which, from the transit viewpoint, is the area in Manhattan south of Central Park between Second and Tenth Avenues.

No close estimate of the cost of construction of the enlarged transit system is possible at present and it is not intended that the comprehensive scheme as laid out in its entirety will be undertaken at once, but that it should be proceeded with methodically and continually. At pre-war prices it is estimated that the lines contemplated in the suggested program for the next twenty-five years would cost approximately $175,000,000 for construction. At present prices, however, this cost would amount to close to $350,000,000, exclusive of equipment, interest during construction, engineering and superintendence. For proper facilities and equipment an additional $200,000,000 would probably be required at once.

Right to Open Wage Matter to Be Arbitrated

Judge Edward J. Jeffries has been appointed as arbitrator to represent the men in the controversy relative to the 20 per cent reduction in wages proposed by the Detroit (Mich.) United Railway. Judge Jeffries will act with John A. Russell, appointed to represent the company. They will select the third arbitrator. The men maintain that the company had no right to break the wage contract now existing by opening the question before the expiration of the contract agreement. In the event the present board should decide that the wage agreement can be opened the next step will probably be the arbitration of the wages, although there seems to be some doubt as to what action will be taken next.

The men refused to appoint an arbitrator until advised by the company that it was ready to accept the condition that the only question to be arbitrated now is whether or not the subject of wage adjustment can be opened at this time without the union's consent.

In advising the officials of the union of its acceptance of their view regarding the matter the company cited the fact that the situation is urgent and requested the men to name their representative without delay.

The differences to be arbitrated are set forth as (1) the right of the parties or either of them to open the agreement and (2) the foregoing having been decided affirmatively, to proceed then forthwith to arbitrate sections of the existing agreement dealing with working conditions and wages.

In concluding their reply to the company's communication officials of Division 26 of the Amalgamated Association said:

> We are compelled to inform you that until the subject which is to be arbitrated is mutually agreed on, in accordance with our agreement, we must decline to name our arbitrator and will await any further suggestions that you have to make on this matter.

Cities Urge Electrification

Municipalities along the lines of the London, Huron & Bruce and the Stratford-St. Mary's branches of the Grand Trunk Railway in Western Ontario are organizing a campaign for the electrification of both lines.

The London, Huron & Bruce line runs northward from London to Wingham, a distance of about 50 miles along the shore of Lake Huron, and the Stratford-St. Mary's branch from London to Stratford, about 40 miles. Each railway taps a very rich farming country, but the service on the steam lines is infrequent and unsatisfactory.

The government of the Dominion of Canada having taken over the Grand Trunk Railway the municipalities believe electrification will be secured without difficulty. If the scheme is carried out the electrified lines will be linked up with the London & Port Stanley Railway, which is owned by the city of London and is operated between that city and Port Stanley, an important harbor on Lake Erie. The system of the London & Port Stanley Railway consists of 35 miles of railway.

$550,000 Forfeit Bond Refused

The General Electric Company has offered to pay the city of Dallas, Tex., $550,000 in cash, the amount of the two bonds which the company executed in 1917 as a guarantee that it would build two interurban lines, each at least 30 miles in length, if the city in turn would relieve the company from all obligation in connection with the building of the lines which are proposed.

The City Commissioners at a meeting on Jan. 15 declined to accept the payment of the forfeit, but in lieu thereof extended the time in which the General Electric Company, owner of the Dallas Railway, is to comply with the terms of its commitments. The company now has sixty days from Jan. 15 to begin work on the first interurban and eighteen months to begin work on the second. The first interurban must be begun by March 15, 1921, and the second interurban by Sept. 15, 1922.

The General Electric Company said:

> So confident are the petitioners that the building of these roads in the near future will entail upon them an unreasonable loss that the General Electric Company interests would be grateful to the city of it will permit them to pay to it now the amount of said two bonds, to wit, $550,000 in cash.

It was declared, however, in the petition that if the city is unwilling voluntarily to accept the forfeit as tendered "it is not the purpose of petitioners to compel it so to do by putting the city to the enforcement of its legal rights, but it is their purpose to perform the promise made by the said Hobson and carry out and fulfill same in good faith."

Near the End

Period Drawing to a Close in Which to Complete Toledo Settlement—Commission Reported Selected

Less than a week remained on Jan. 26 to put the cost-of-service plan at Toledo into operation. The ordinance provides that the railway shall be turned over to the new Community Traction Company, "free from all mortgage encumbrances." To bring this about the Doherty interests would have to raise $1,900,000 cash in addition to the cash required to place the ordinance in operation.

Henry L. Doherty asked all Toledo banks to participate in a loan of $2,700,000 to take care of this item, the operating finance and equipment liens. He offered them the $8,000,000 of bonds of the Community Traction Company, as collateral and agreed to pay 12 per cent interest for the money. The deal would be made with the expectation that the whole proposition could be refinanced later in the year.

Toledo bankers have said many times they would not be able to help in the situation because such a large amount of cash was involved and the loans of most of the larger banks are up to their legal limits and the limits imposed by the Federal Reserve Bank.

MORTGAGES TO BE CONTINUED

To the end that the plan put before the city by the Doherty interests last week might become effective so that the ordinance could begin to operate on Feb. 1, James Martin of the city legal department and George Welles, attorney for the company, began work on an agreement between the city and the Toledo Railways & Light Company, by which the mortgage encumberance could run on for a few months and to protect the city interests all the bonds of the traction property would be held in trust by the sinking fund trustees of the city. This would not allow the company any return on the property until the mortgage was lifted.

The city officials have agreed to waive the exact wording of the ordinance in order to put the cost-of-service plan into effect. It is also desired to get the approval of the City Council. There is some question, however, about the legality of the scheme which might endanger the plan at some future time. It was doubted whether such an agreemen would be ready for submission to Council on Monday.

Charles A. Frueauff, counsel for Henry L. Doherty, was expected in Toledo on Jan. 24 to approve a final agreement to make the ordinance effective.

The Public Utilities Commission has agreed to let the Community Traction Company, originally incorporated for $100, proceed to issue $10,000,000 in common stock, $2,000,000 in preferred stock, and $8,000,000 in twenty-five-year first mortgage bonds. It also gave its approval to the transfer of the Rail-Light property over to the Community Traction Company.

When the new ordinance goes into effect fares will be reduced from 7 to 6 cents and transfers from 2 to 1 cent.

It is understood that the street railway board of control has selected a man for commissioner of transportation under the new grant but that the board is withholding the name until the operation of the cost-of-service ordinance is assured.

Deferred Repairs Cost City of Seattle $1,500,000

In a public speech recently D. W. Henderson, superintendent of the Seattle (Wash.) Municipal Railway, reviewed the problems of municipal ownership, stating that the railway lines would have gone into the hands of a receiver had the Stone-Webster Company not sold them to the city for $15,000,000. Mr. Henderson was for many years superintendent of transportation of the lines at Seattle when they were under private operation. He said the private company had made only ⅝ of 1 per cent annually on the lines during the last five years of their operation and that the city officials "no doubt failed to study details of cost" of the lines before they purchased them, erroneously believing that the company "was making all kinds of money on a 5-cent fare." He expresse the belief that if the city on taking over the lines had immediately increased the fares it would be reducing fares now instead of increasing them.

In explaining mounting costs, Mr. Henderson pointed to two wage increases. These, he said, were unavoidable. He also stated that the Puget Sound Traction, Light & Power Company suspended all repairs the moment the city began to talk seriously about taking over the lines and that the city has been forced to spend $1,500,000, when labor was highest, on repairs alone. He stated that operating costs had been reduced 4.2 per cent in the last year.

Construction Abandoned — Construction Proposed

The construction of the proposed interurban railway from Dallas, Tex., to Wichita Falls, a distance of approximately 110 miles, has been temporarily abandoned, due to inability to finance the line successfully. The negotiations have been dropped until the financial conditions are improved.

In the meantime the Dallas (Tex.) Railway has been given to understand by the city of Dallas that it must carry out its commitments to build the two interurban lines, each at least 30 miles in length, and in return J. F. Strickland, president of the Dallas Railway, has revived interest in the proposed line to Terrell. Mr. Strickland announces that his company is now carrying on negotiations with Terrell and intervening towns with a view to building this line first, and that after it is built he will turn his attention to construction of the other line.

Commissioners Disagree

Judge Reed, Kansas, Against Theory of Need for One Body to Hear Wage and Rate Cases

Judge Clyde M. Reed of the Kansas Industrial Court refused recently to sign the biennial report of the court to the Governor. Instead he sent to the Governor a special letter calling attention to errors in the report as submitted by Judges Huggins and Wark relating to the work of the court.

WAGES AND RATES COUPLED

In the letter of Judges Huggins and Wark appears this statement:

> After several wage cases had been brought on the industrial side, it was discovered that a shorter and cheaper way to arrive at the matter of increased wages was to try the wage question out at the same time as the rate increase application by the utilities.

There was not, according to Judge Reed, any substantial basis for a statement of this kind. On the other hand Judge Read said:

> If any such practice has been followed I am ignorant of it. It is true that wages are operating expenses and the operating expense is an important factor in the adjustment of rates to a public utility, but following that line of analogy every public service commission would be an industrial court, including the public utilities commission, which was the predecessor of the present Kansas Court of Industrial Relations. It will not be seriously contended that this is the case.
>
> There has been some insistence on the part of some of the utilities companies that the question of wages and rates must be tried together. The court has not accepted that theory as a governing rule and in only one instance have these questions been considered together in an industrial case.
>
> Sound public policy, in my judgment, requires that the matter of wages and rates be considered separately. There is a relation between wages as an operating cost and the rates of common carriers and public utilities, but they are separate factors, each of which should be considered on its merits.

Judges Huggins and Wark in their statement said:

> We have attempted in this report to outline our industrial and utility activities separately, but the two phases of the work are, and have been, so closely related that it has been quite impossible accurately to separate them. Some of the cases that have been docketed and heard on the industrial side have involved utility problems, and, on the other hand, some cases filed on the utility side have involved industrial questions.

JUDGE REED DISSENTS

Judge Read did not agree with the sentiments so expressed. In his letter he said:

> In the discussion now current as to the best method of organizing the court for future work, it may be accepted as a statement that the industrial and utility work is so closely interwoven that it cannot be separated. That such a conclusion would be unjustified is evident from an analysis of the cases which have been filed on the industrial side and heard by this court. Since the court was established twenty-eight industrial cases have been filed, of which five are still pending.
>
> An analysis of the industrial cases heard by the court would reveal the fact that in but one case, that of the Topeka Railway, was the question of rates and wages brought into the same case for consideration by the court. The question of wages and rates was present in the Wichita Railway case, but the court had no direct jurisdiction over the question of rates and that was settled by the City Commission of Wichita.
>
> An analysis of the cases heard to date gives no support whatever to the theory that there is any vital necessity for considering wage and rate cases by one body. This is a matter to be determined on general policy.

Colonel Kealy Among His Men

Incident to the luncheon to Col. Philip J. Kealy upon his retirement from active supervision of the management of the Kansas City (Mo.) Railways the employees assembled before the offices of the company for the group picture shown in the accompanying illustration. Colonel Kealy appears in the center of the group of his co-workers, only some of whom are shown in the reproduction on account of space limitations.

Some of the remarks by Colonel Kealy to the men were included in the account of the luncheon which was published in the issue of the ELECTRIC RAILWAY JOURNAL for Jan. 15. Among statements not recorded previously was the response of Colonel Kealy showing appreciation of the evidence on the part of the men that his work at Kansas City had resulted in substantial and continuing loyalty of service to the community and to the utility.

COLONEL KEALY THE CENTRAL FIGURE AMONG A GROUP OF HIS EMPLOYEES

He said that the good judgment of the men in adopting the co-operative plan had been vindicated, for under it there had been great improvement of service to the public and material benefit to the employees. Moreover, employees elsewhere, more particularly in the East, were finding the plan as installed at Kansas City to be almost an ideal application of the general principle of participation toward which employers and employees were more and more tending.

Back Pay Obligations Anticipated by P. R. T.

Payment of back wages of $1,000,000 to the trainmen of the Philadelphia Rapid Transit Company will be made on Feb. 1. This announcement was made by President Thomas E. Mitten of the company to the men at the annual meeting of the members of the Co-operative Welfare Association, to which reference was made in the ELECTRIC RAILWAY JOURNAL of Jan. 22, page 187. Mr. Mitten is quoted as follows:

> You remember, and I have no doubt you remember well, that when I last talked to you here and you agreed to await the payment of your back wages until the company could earn the money I then said I hoped the company would be ready and able to pay early in the year 1921.
>
> It will take at the present rate of earning until about May 1 to get the million dollars owing to the men, and that is about what it amounts to with interest from November. It will take all that we can earn after paying the necessary bills up to May 1 to save that amount, but I am very glad to tell you that through an arrangement which we have been able to make with Mr. Stotesbury's bank we shall pay you in full with interest on Feb. 1.

Transportation District Plan Approved

Mayor Thompson's traction plan for Chicago which provides for 5-cent fares and the creation of an independent taxing body to be known as the Transportation District, which would own and operate the surface street railways, was approved by a vote of eight to two by the Local Transportation Committee of the City Council on Jan. 17.

The vote was taken very unexpectedly with eight Aldermen absent and without waiting to hear various civic organizations which had given notice that they wished to be heard. It was expected that the matter would be placed before the City Council on Jan. 19 for expected approval of that body and then sent to the State Legislature without alteration.

Know Your Employees!

The January issue of *Sparks*, published by the Toledo Railways & Light Company, which is controlled by H. L. Doherty & Company, printed in full the paper on "Labor Efficiency" read by Frank R. Coates at the Doherty managers' meeting in New York. Mr. Coates believes in welfare work but not in a bonus system. He has suggested seven ways of obtaining greater efficiency in operating Doherty interests. They are as follows:

1. Know your employees.
2. Have your employees know you.
3. Have your workers and co-workers contented.
4. Treat them all fairly and squarely.
5. Let them know by practical examples that their future depends entirely upon themselves.
6. So educate all in your employ that they respect and revere the American flag, and that they know for a certainty that the same principles that the flag symbolizes are the underlying principles in your business.
7. Lastly, have all in our great organization follow out to the fullest extent, our slogan: "Pride of Workmanship" and "Pride of Service."

Franchise Settlement Plan Started

Initiative petitions for the passage of a city ordinance providing for the service-at-cost plan of street railway transportation proposed by the Detroit (Mich.) United Railway have been filed with the city clerk. More than 8,000 signatures have been secured for the petition, it is reported, a number greatly in excess of that required by the city charter.

If the proposed ordinance is laid on the table or meets with adverse action on the part of the Mayor or the City Council the proposition will be submitted to the voters for decision at a coming election.

A printed copy of the ordinance will be sent by the Detroit United Railway to each of the 320,000 registered voters of Detroit, to afford them an opportunity to study the ordinance provisions prior to the election.

Articles of incorporation for the Detroit-Service-at-Cost Railway, according to the plans of the Detroit United Railway, have been filed with the Secretary of State at Lansing. The Public Utilities Commission has been asked for permission to start such a project.

The stockholders are Frank W. Brooks, A. F. Edwards and A. A. Peters. They are respectively the president, vice-president and treasurer, and secretary of the Detroit United Railway. The authorized capital of the new company is stated as $25,000, a nominal sum.

The new company proposes to acquire, own and operate street railways in the city of Detroit, within the boundaries of the city as the same may from time to time exist, and in the city of Highland Park and the village of Hamtramck.

Bill for Franchise Readjustment

There has been introduced in the Ohio Senate a bill designed to terminate perpetual franchises held by the Columbus Railway, Power & Light Company on fifteen Columbus streets. The bill is the result of prolonged dissension between the company and the city over adequacy of service.

The rate of fare until a little more

than a year ago was eight tickets for 25 cents. Repeated attempts to get a higher fare during the war failed, but eventually Council granted a fare of 6 cents cash, with five tickets for 25 cents, the understanding being that certain betterments would be carried out.

It is argued by the Columbus Street Railway Home Rule Association and others interested that with the termination of the perpetual franchises the city will be in a much better position when it makes a new contract for service. The blanket franchise ends on April 29, 1926, and under the bill introduced in the Senate the perpetual franchises would be ended at the same time. Nine of the principal streets in Columbus are occupied by lines under the perpetual franchises, while other important streets are under the same certain betterments would be made.

Ordinance Would Permit Cleveland Railway to Sell Stock

Following a letter of John J. Stanley, president of the Cleveland (Ohio) Railway, to Fielder Sanders, City Street Railway Commissioner, in which it was pointed out that the company needed funds for improvements and extensions, an ordinance has been introduced in Cleveland City Council by Councilman Dittrick authorizing the sale of $3,000,000 of capital stock of the Cleveland Railway at less than par. The ordinance amends the Tayler service-at-cost franchise. It follows:

Be it ordained by the Council of the city of Cleveland, State of Ohio:

Section 1. That the Cleveland Railway be, and it is hereby, authorized to issue and sell $3,000,000, and no more, of its capital stock at not less than $80 per share, a discount that will yield not more than 7½ per cent interest per annum to the purchasers of said $3,000,000 of stock, said issue to be subject to approval by the Public Utilities Commission of Ohio; the proceeds of the sale of said stock to be used to pay or reduce the company's floating indebtedness, to pay for such extensions, betterments and permanent improvements as have been or hereafter may be authorized by the City Council of Cleveland and for any other purpose or purposes for which such proceeds may be lawfully used under the provisions of ordinance No. 48,845-A as amended by ordinance No. 49,970, the difference between the par of said capital stock and the amount realized from its sale to be amortized from earnings within two years after its issue; that the company be, and it is hereby, directed to charge to a stock discount account as the stock is sold said difference between par and the selling price and to deposit in bank the sum of $25,000 per month as a sinking fund for the amortization of said difference, crediting said sums from month to month to said stock discount account until said account is extinguished, and that thereupon the company use said sinking fund to reduce the amount of the then outstanding bonds or capital stock of the company or to pay for extensions, betterments and permanent improvements; that said monthly sums may from time to time, with the express approval of the Council, be invested in securities or used to retire stock or bonds or to pay floating debt or to pay for extensions, betterments or permanent improvements instead of being deposited in bank until the extinguishment of said stock discount account; that the rate of interest upon the present outstanding bonds and stock of the company shall not be increased by this permission to sell additional stock.

Sec. 2. This ordinance shall take effect and be in force from and after its passage and legal publication.

Mr. Stanley's letter to Mr. Sanders stating the company's needs was published in the ELECTRIC RAILWAY JOURNAL for Jan. 22.

News Notes

Thirty-three per Cent Increase for Power.—The Cleveland (Ohio) Railway has announced that the Cleveland Electric Illuminating Company has asked the State Public Utilities Commission to approve a 33 per cent increase for current supplied to the railway.

Home Rule Appeal in Indiana.—Mayor Benjamin Bosse of Evansville, Ind., and the City Council have appealed to the Legislature to repeal the law creating the Indiana Public Service Commission and to restore power to regulate public utilities to the cities of Indiana.

Rehearing Asked in Freight Case.—The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has filed with the Wisconsin Supreme Court a motion for rehearing on that section of the recent decision of the court in the interurban franchise case dealing with the transportation of freight. The company asks that the injunction against carrying freight on the Milwaukee-Waukesha line of the company be limited to that portion of the line east of the west line of Layton Boulevard in the city of Milwaukee. The case was reported in the ELECTRIC RAILWAY JOURNAL of Dec. 25, 1920, page 1307.

Employees Fully Informed.—The Jan. 15 issue of *Trolley Topics* contains a full reprint of the letter delivered by J. P. Barnes, president of the Louisville (Ky.) Railway, to each Councilman and Alderman previous to the aldermanic meeting of Jan. 4, replying to the report of the Railroad Committee of the General Council. It was the desire of Mr. Barnes through *Trolley Topics* to acquaint all employees of the Louisville Railway with facts about the railway's financial condition and to point out certain wrong deductions in the report of the Railroad Committee to the Board of Councilmen submitted on Dec. 28 last.

Public Service Is the Railway's Function.—E. F. Sweet, former congressman and at present assistant secretary of commerce at Washington, D. C., recently reiterated the findings of the Federal Electric Railways Commission at the twelfth annual banquet of the Jackson (Mich.) Chamber of Commerce. Mr. Sweet remarked that one of the first things upon which the members of the commission agreed was the idea that the function of railroads was public service and not private profit. An account of Mr. Sweet's review of the commission's work was published in the ELECTRIC RAILWAY JOURNAL for Jan. 22, page 171.

Ambitious Auto Proposal in Portland.—The City Council of Portland, Ore., has been asked to consider an application for franchise to operate a bus line between Portland and Linnton, with large automobile buses, and with a 10-cent fare. W. H. Hyatt, who applies for the franchise, states that he has succeeded in interesting representative business men of Portland and that he is certain he can succeed in the organization of such a company. He was given thirty days in which to make a report to the Council. Several applications have been submitted by other bus operators, but residents of Linnton have urged that no extensive franchises be granted to present operators as the service and charge have been unsatisfactory.

Paving Suit Suspended.—The City of Dallas, Tex., will suspend all suits and litigation in preparation of being filed against the Dallas Railway to compel the company to carry out certain improvement projects, with special reference to paving between its tracks and for a specified distance outside of each track on streets which the city is improving. Action looking to this end was taken by the Board of City Commissioners after a committee of the directors of the traction company had called on the board and had agreed to accede to the city's order for paving certain streets and making other improvements. The company has agreed to set aside all revenue after paying operating expenses, including taxes, maintenance and accident reserves, all interest and fixed charges, including payments on car trust certificates for a period of five months from Dec. 1, 1920, to May 1, 1921.

Program of Meeting

Canadian Electric Railway Association

The complete program of the annual convention of the Canadian Electric Railway Association, which is to be held at the Chateau Laurier, Ottawa, Jan. 31 and Feb. 1, has been made public. The meeting will be called to order at 10 a.m. on Jan. 31 when the president will address the meeting and association business will be discussed. On the afternoon of Jan. 31 the following papers will be read:

"Practical Operation of a Service-at-Cost Contract," by J. E. Hutcheson, manager of the Montreal Tramways.

"The Safety Car," by J. C. McCune, Safety Car Devices Company, New York.

"Adaptability of the Safety Car to Canadian Snowy Climate," by H. E. Weyman, manager of the Levis County Railway.

On Feb. 1, prior to an address by H. B. Morley, general manager of the Ontario Safety League, the following papers will be read:

"Publicity," by A. W. McLimont, vice-president and general manager of the Winnipeg Electric Company.

"Accident Prevention Everybody's Business," by R. Mayne Reid, superintendent of the Quebec Railway.

The meeting will be concluded with the election of officers.

Financial and Corporate

Steps Toward Reorganization

Representatives of Holders of Securities of Rhode Island Company Proceeding With Plans

The first real step looking to the reorganization of the electric railways in Rhode Island which remain as a part of the old Rhode Island Company system was taken during the week ended Jan. 22 when the United Electric Railways came into actual existence.

This corporation was created by act of the Rhode Island General Assembly nearly two years ago to take over the properties operated by the Rhode Island Company. The incorporators were former Governor R. Livingston Beeckman, Bank Commissioner George H. Newhall and Zenas W. Bliss, one of the three receivers of the Rhode Island Company. Acting for his associates, Mr. Bliss has paid into the State Treasury the free required under the act and has received the charter. The incorporators plan within a few days to organize the new company.

$1,000,000 OF NEW CAPITAL

The decision to take out the charter was reached at a meeting of the joint reorganization committee, composed of Samuel P. Colt, Stephen O. Melcalf and Michael F. Dooley. At this meeting the agreement and plans of reorganization were passed upon by the representatives of the three protective committees representing the various groups of holders of the securities of the underlying properties of the Rhode Island Company. Provision for raising the $1,000,000 of new capital required under the reorganization is understood to have been made.

Following the organization of the new company, copies of plans and the agreement will be sent to the individual security holders who will be granted thirty days in which to examine and return them with their approval or disapproval.

The United Electric Railways, under its charter, is authorized to issue a capital stock of $22,000,000 with which to acquire the properties.

There was introduced in the Legislature on Jan. 20 an act amending the charter of the United Electric Railways so as to relieve it from any and all state and city franchise tax payments of the companies that it may acquire.

Taxes of this character amounting to more than $750,000 have accrued and are now owed by the Rhode Island Company to the city of Providence and the state and city franchise tax payments act was passed designed to relieve the new company from assuming any of these obligations. Certain ambiguities in this act, however, have raised a doubt as to whether the object sought has been accomplished. In order that there may be no question about the matter in the future the recent act is presented to clarify the previous enactments of the Legislature.

The United Electric Railways on Jan. 25 organized temporarily to advance the reorganization. Officers were elected as follows: President, Zenas W. Bliss; secretary and treasurer, George H. Newhall; directors, Preston H. Gardner, J. Cunliff Bullock, Francis F. Bales, George H. Newhall and Zenas W. Bliss. Permanent organization of the corporation will probably be brought about at a meeting to be held in February. The personnel of the permanent organization will be decided at conferences with committees of security holders.

At the meeting on Jan. 25 the charter of the new corporation was accepted and $5,000 of stock was subscribed. These steps were necessary before the incorporators could have the status of stockholders and proceed with the temporary organization.

Receivers Named for Ohio Electric Railway

B. J. Jones, Columbus, former general manager of the Ohio Electric Railway, Lima, Ohio, was appointed receiver for that company on Jan. 25 by Federal Judge John M. Killits. His bond was fixed at $50,000. At the same time Henry C. Paul, Fort Wayne, Ind., was appointed receiver for the Fort Wayne division and J. Harvey McClure, Lima, was made receiver for the Indiana, Columbus & Eastern Railroad. Messrs. Paul and McClure, however, will work under the direction of Mr. Jones.

The appointment of the receivers was the first step in foreclosure proceeding begun by the Fidelity Trust Company, Philadelphia, Pa., representing the holders of bonds secured by mortgages on all the properties. Three semi-annual interest payments on the bonds are in default. Other subsidiary companies affected are the light and power plants at Lima and railroad lines to Defiance and from Lima to Toledo.

Paul C. Martin, Springfield, general counsel for the railroad, said that no changes in the organization are planned at this time. The operation of the lines will continue as heretofore. Mr. Martin said the need for the appointment of receivers arose because of "inability to obtain increased passenger rates, added expense due to war prices and the development of the automobile."

Seven-Cent Fare Increasing P. R. T. Income

The 7-cent fare in Philadelphia is having a noticeable effect upon the net income of the Philadelphia (Pa.) Rapid Transit Company, as shown by its December statement. In December, 1919, the company showed a net income of $33,127, which in one year's time was increased to $427,494. After deducting $125,000 for a 5 per cent return on Philadelphia Rapid Transit stock a surplus remains of $302,494. An evidence of what the 7-cent fare is doing for the financial condition is seen in the net income for the year just ended, amounting to $382,065, and for one month amounting to $427,494. However, more than 2,000,000 fewer revenue pasengers were carried during December, 1920, than in the same month of 1919.

STATEMENT OF EARNINGS OF PHILADELPHIA RAPID TRANSIT COMPANY

Month Ended Dec. 31, 1920	1920	1919	Percentage Change Over 1919
Operating revenue	$3,889,911	$3,141,534	23.8
Operation and taxes	2,696,979	2,493,810	8.2
Operating income	$1,192,932	$647,723	84.3
Non-operating income	61,740	197,706	—68.8
Gross income	$1,254,672	$845,430	48.4
Fixed charges	827,177	$812,302	1.8
Net income	$427,494	$33,127	1,190.0
5 per cent return on P. R. T. paid in capital—one month	125,000		
Surplus	$302,494		

Year ended Dec. 31, 1920	1920	1919	Percentage Change Over 1919
Operating revenue	$38,807,354	$35,358,471	9.8
Operation and taxes	29,195,165	24,587,991	18.8
Operating income	$9,612,188	$10,770,480	—10.8
Non-operating income	592,986	681,048	—12.9
Gross income	$10,205,175	$11,451,528	—10.9
Fixed charges	9,823,110	9,735,651	0.9
Net income	$382,065	$1,715,876	—77.9
5 per cent return on P. R. T. paid in capital—year	1,500,000		
Amount by which gross revenues are insufficient to provide for operating expenses, taxes, fixed charges, and the 5 per cent return upon P. R. T. stock	$1,117,934		

COMMENT.—Deferred wages formerly shown as an adjustment to net income are now included in the income account for the year ended Dec. 31, 1920. This deferred wage, amounting in total to $949,766, has been made possible of payment to the men as at Feb. 1, 1921, through arrangements with Messrs. Drexel & Company, the company's bankers.

Ten Cents Permanent Chicago Fare

$86,250,000 Fixed as Value of Chicago Elevated Lines—7.5 per Cent Return Allowed—Estimated Earnings for 1921 Only 4.23 per Cent

In an order made a few days before they retired from office, the Illinois Public Utilities Commissioners entered a permanent order as to the value of the elevated railway properties in Chicago, for rate-making purposes, and the rate of fare, in a case which originated before the commission on Sept. 2, 1918. The commission fixed the fare at 10 cents. As of Jan. 4, 1921, it found the value of the properties for rate-making purposes to be $86,250,000.

THE commission found the original cost of the used and useful property of the four elevated companies to be $71,500,000; the original cost less accrued depreciation, $60,775,000; the cost of reproduction new, $95,000,000; the cost of reproduction new less accrued depreciation, $80,750,000; the amount of the element of going value, $6,000,000, and cash working capital and materials and supplies, $1,000,000. After considering all of these elements of the value of the properties of the Metropolitan West Side Elevated Railway, the Northwestern Elevated Railroad, the South Side Elevated Railroad and the Chicago & Oak Park Elevated Railroad, the commission, as previously stated reached the opinion and found that the fair rate-making value of these properties combined is $86,250,000, as of the date of the order, Jan. 4, 1921.

STATISTICS OF SECURITIES CHICAGO ELEVATED RAILWAYS

(As of Dec. 31, 1919.)

Security	Total	Annual Interest
Stocks—		
Preferred	$13,651,900	....
Common	32,545,646	....
Total	$46,197,546	....
Bonds—		
1st mortgage—1938	$10,000,000	$400,000
Extension—1938	5,000,000	200,000
1st motrgage—1936	453,000	22,650
1st mortgage—1941	12,500,000	625,000
1st mortgage—1941	12,500,000	....
1st mortgage—1945	4,472,000	223,600
1st mortgage—1924	8,000,000	360,000
1st mortgage—1928	4,432,000	221,600
Income	987,000	49,350
Scrip	12,500	625
Total	$58,356,500	$2,102,825
Notes—		
Joint equipment	$1,985,000	$99,250
Car	172,000	9,920
Receiver certificate	1,645,000	98,700
Mortgage	6,863	347
Borrowed	154,000	7,700
Chicago Elevated Railways	4,060,763	212,232
N. W. E. R. R.	482,402	24,120
Central Union Telegraph Company	132,975	6,648
	$8,639,003	$458,917
Grand total	$113,193,049	$2,561,742

As in the permanent order covering the case of the Chicago Surface Lines, the commission specified that the elevated lines should be entitled to a return of 7.5 per cent upon the above value. The rate of fare established by the commission as permanent will not, however, earn this surplus by a considerable amount, according to its own computations.

On July 31, 1920, the commission ordered the rate of fare to be placed at 10 cents cash with four tickets for 35 cents. In this permanent order, as of Jan. 4, 1921, the commission stated that these same rates should be continued in effect. At these rates, the commission estimates that the companies will earn during the year 1921, including revenues from sources other than transportation of passengers, approximately $18,400,000. The estimate of the total operating expenses is $14,285,000, including an allowance of $468,000 fixed in this order for depreciation. Deducting these expenses, $3,647,000 remains to provide for return upon the investment. This is only 4.23 per cent on the established valuation of the properties.

In justifying these rates of fare, the commission took into consideration the downward trend of prices. It also calls attention to the competitive situation existing between the elevated and surface lines. In 1919, there were 13,000,000 fewer revenue passengers on the elevated than in 1918, when the fare was 5 cents, and in 1920 about 7,000,000 fewer passengers were carried than in 1918. The commission then says that "when it is considered that for all except a small part of their business, the elevated lines must actively compete with the Chicago Surface Lines, steam railroads and other transportation agencies, it seems plain that a differential greater than that now in effect would cause a substantial loss of business." The differential referred to as now existing is 0.75 cents, if tickets are purchased on the elevated and 2 cents where a cash fare is paid, the fare on the Chicago Surface Lines being 8 cents flat.

The commission also makes note that the operating expenses of the companies were approximately $7,616,000 greater in 1920 than in 1916, while the revenues were about $8,534,000 greater. Hence, under the rates now in force, the companies have increased their net earnings about $918,000 over 1916. This, the commission says, compares favorably with the average results for the five years from 1913 to 1917, inclusive, wherein the companies had a net return on the average $1,140,255 less than is estimated will accrue to them in the year 1921 under the rate authorized.

In the report is included the accompanying summary of the outstanding obligations of the elevated companies. From this it is seen that the total outstanding securities amount to $113,193,049 and the total bonded and floating indebtedness $66,995,503. The estimated surplus of $3,647,000 for 1921 will thus provide an average interest earning of 5.4 per cent on the funded debt, as it existed as of Dec. 31, 1919.

In the accompanying table of the consolidated income statement of the four elevated railways, there is shown the average fare received during each of the several years covered in the statement. Throughout the period of

CONSOLIDATED INCOME STATEMENT CHICAGO ELEVATED RAILWAYS

(Year Ended Dec. 31.)

Item	1913	1914	1915	1916	1917	1918	1919	1920*
Revenue passengers	164,164,225	165,770,161	164,673,516	180,654,632	193,120,173	197,440,107	184,663,025	190,630,210
Average fare	5.152c	5.164c	5.161c	5.156c	5.155c	5.285c	6.976c	8.388c
Revenues:								
Passenger	$8,459,940	$8,560,492	$8,499,170	$9,314,348	$9,970,869	$10,434,815	$12,881,311	$15,990,702
Other transportation	467,373	444,822	432,414	453,774	484,859	521,396	602,247	754,250
Non-operating	250,042	97,367	37,506	97,965	84,911	74,451	82,831	100,221
	$9,177,355	$9,102,681	$8,969,090	$9,865,987	$10,540,639	$11,030,662	$13,566,389	$16,845,173
Expenses:								
Way and structures	$235,701	$230,073	$230,883	$290,221	$341,179	$497,923	$1,036,480	$1,736,382
Equipment	293,490	353,638	473,180	537,481	641,989	724,323	1,032,497	1,401,621
Power	1,147,904	1,130,617	1,111,693	1,240,144	1,370,908	1,297,969	1,376,159	1,491,123
Conducting transportation and traffic	2,400,481	2,514,811	2,553,767	2,783,447	3,055,827	3,748,681	5,117,296	6,991,518
General and miscellaneous	343,214	363,000	339,710	348,896	450,425	416,535	730,002	788,879
	$4,420,790	$4,592,139	$4,709,233	$5,200,189	$5,860,328	$6,685,431	$9,292,434	$12,409,523
Operating Expenses:								
Taxes, car licenses, etc.	$787,537	$781,082	784,690	$876,211	$971,130	$1,079,323	$908,057	$1,089,376
Rentals	233,705	271,350	253,551	289,862	314,174	294,347	342,673	363,870
Total	$5,442,032	$5,644,571	$5,747,474	$6,366,262	$7,145,632	$8,059,101	$10,543,164	$13,862,769
Available for depreciation and return on investment	$3,735,323	$3,458,110	$3,221,616	$3,499,725	$3,395,007	$2,971,561	$3,023,225	$2,982,404
Rehabilitation not included in above figures	$696,339	$704,102	$404,077	$302,616	$328,919	$71,222	....	....
Available for depreciation and return on investment after deducting rehabilitation	$3,038,984	$2,754,008	$2,817,539	$3,197,109	$3,066,088	$2,900,339	$3,023,225	$2,982,404
Note A—The above statement excludes following amounts of replacement reserve							$195,339	$781,357

* First eleven months actual results; estimated for December.

SUMMARY OF APPRAISALS, CHICAGO ELEVATED RAILWAYS

Submitted By	Appraisal	Basis	Cost—New	Cost—New Less Depreciation
Company	June 30, 1919	Reproduction; prices as of the first six months of 1919: Owned lines	$133,958,284	$115,879,643
Company	June 30, 1919	Reproduction; prices average 1916-1920, inclusive: Owned lines	$133,170,108	$114,989,053
Company	June 30, 1919	Reproduction; prices average 1913-1919, inclusive: Owned lines	$112,887,664	$98,337,464
Company	June 30, 1919	Reproduction; prices average 1906-1915, inclusive: Owned lines	$95,676,254	$84,463,620
City	June 30, 1919	Reproduction; prices as of the first six months of 1919: Owned lines	$91,470,852	$74,946,882
Arthur Young & Company—		Book costs to June 30, 1919		$91,732,724
Commission Chief Accountant:		Book costs to Dec. 31, 1919		* $84,790,677

* Includes purchase price of Union Elevated Railroad (Union Loop) $10,916,000; actual cost of construction (Commission Exhibit 8), was $4,408,854.

Note A.—The cost of reproduction of physical property as above set forth embodies, for prices as of the first six months of 1919, all changes in specific accounts together with changes in overheads to conform. Costs of reproduction on price bases as of 1916 to 1920, 1913 to 1919, 1906 to 1915, embody only changes in specific accounts, the overheads not having been recomputed. The recomputation of overheads would tend to increase the figures in these three cases slightly.

Note B—Above appraisals do not include the following amounts for working capital and development cost.

Prices as of	1st 6 mos. 1919	1916–1920	1913–1919	1906–1915	Book Cost
For working capital	$2,000,000	$2,000,000	$2,000,000	$2,000,000	$2,000,000
For development cost	12,460,000	11,800,000	11,800,000	11,800,000	11,801,754
Total	$14,460,000	$13,800,000	$13,800,000	$13,800,000	$13,801,754

the three years ended June 30, 1916, 1917 and 1918 the 5-cent flat fare was collected by the company and the higher than 5-cent average fare is accounted for by the second fare paid by Evanston passengers. A straight 6-cent fare became effective Nov. 22, 1918, and in the nine months ended July 31, 1919, the average fare collected thereunder was 6.113 cents. A straight 8-cent fare became effective on Aug. 8, 1919, and during the six months ended Jan. 31, 1920, the average fare received thereunder was 8.110 cents. An 8-cent cash fare with two tickets for 15 cents, which became effective Feb. 1, 1920, resulted in an average fare during the six months ended July 31, 1920, of 7.745 cents. The 10-cent cash fare with four tickets for 35 cents, which became effective Aug. 4, 1920, resulted in an average fare during September, October and November, 1920, of 9.267 cents. The average fare shown in the table referred to is, of course, the average for the year, which in some cases involves a change in the rate.

In establishing $468,000 as the amount that would be allowed annually to provide for the depreciation accruing in the properties which is not cared for in operating expenses, the commission accepted the per centage rates of depreciation determined by the company and shown in an accompanying table, but the commission applied these rates to the original costs of the various classes of property instead of to the cost-of-reproduction new figures used by the company and appearing in this table. On the basis of computation used by the companies, the annual amount necessary was $883,393, as against $468,000 allowed by the commission, including $14,600 for depreciation on leased lines which the companies are obliged to maintain under their contracts.

In presenting its case to the commission, the Chicago Elevated Railways submitted reproduction cost values and the book value of the properties. The city submitted one valuation and the chief accountant of the commission submitted a separate estimate of the book costs. These appear in an accompanying tabulation, from which it is seen that the valuation of $86,250,000 allowed by the commission as of Jan. 4, 1921, is among the lowest figures submitted.

CHICAGO ELEVATED RAILWAYS — ESTIMATED ANNUAL RESERVE REQUIRED FOR REPLACEMENTS EXCLUSIVE OF THOSE CARED FOR BY MAINTENANCE CHARGES AND REFLECTED IN OPERATING EXPENSES, IN ACCORDANCE WITH ACCOUNTING PRACTICE OF COMPANIES. OWNED LINES ONLY

Item	Cost New of Reproduction	Annual Per Cent	Depreciation Amount
Way and structures:			
Engineering and superintendence	$2,761,436	0.55	$15,188
Paving	384,330	2.50	9,608
Elevated structures and foundations	25,022,032	0.71	177,656
Bridges, trestles and culverts	1,451,873	0.81	11,760
Signals and inter. apparatus	947,905	3.33	31,565
Telephone and telegraph lines	127,679	6.13	7,827
Poles and fixtures	80,711	3.33	2,688
Underground conduits	128,319	1.05	1,347
Shops and car houses	1,148,068	1.01	11,595
Stations, miscellaneous buildings	4,980,220	1.05	52,292
Total	$37,032,573	0.87	$321,526
Equipment:			
Passenger and combination cars	$17,447,529	1.58	$275,671
Service equipment	154,709	1.55	2,398
Electrical equipment of cars	6,577,687	1.50	98,665
Shop equipment	264,026	4.00	10,561
Furniture	108,076	2.00	2,162
Miscellaneous equipment	3,923	10.00	392
Total	$24,555,950	1.59	$389,849
Power:			
Power plant buildings	$2,987,422	1.00	$29,874
Sub-station buildings	391,056	1.00	3,924
Power plant equipment	4,491,708	2.33	104,657
Substation equipment	1,046,347	3.20	33,483
Transmission system	2,792	2.88	80
	$8,919,325	1.93	$172,018
Total	$70,507,848	1.25	$883,393

Financial News Notes

Discontinuance of Line Authorized.—In the Superior Court at Westerly, R. I., recently Judge Chester W. Barrows granted the petition of Robert W. Perkins, ancillary receiver of the Shore Line Electric Railway, Norwich, Conn., for leave to discontinue service on the lines operated from Westerly to Watch Hill, Pleasant View and Ashaway. The receiver testified that the lines were operated during the past year at a substantial loss. After hearing the testimony Judge Barrows granted the petition and the receiver in his discretion may discontinue the operation of these lines.

Adrian Road Being Operated Independently.—The annual meeting of the stockholders of the Adrian (Mich.) Street Railway resulted in the divorcing of the control of the property from the Toledo & Western Railroad, which has lately gone into hands of receivers. Frank R. Coates was elected president, Morton Seeley, vice-president, A. C. Van Driesen, treasurer and Henry Ledbetter, secretary. These men are also directors. Steps to place the Adrian system on a more efficient basis were also taken. The system is the terminal for the Toledo & Western line and has been operated by the Doherty interests for a number of years. It is barely paying its way and is for sale. Recently the city was considering buying the lines.

Ownership of Road Established.—The suit instituted in New York by Harry K. Johnson, organizer and first president of the Orleans-Kenner Electric Railway, New Orleans, La., to decide the ownership of the road has been settled out of court, according to advice received by Mr. Johnson at New Orleans. This announcement was made on a recent visit to Paul Maloney, Commissioner of Public Utilities, for the purpose of staying action of the Commission Council to remove the spur track of the Orleans-Kenner road at its present terminus in South Rampart Unit, near Coral. Mr. Johnson promised to provide the road with another terminal inside of sixty days after he obtained possession of the railway. The Orleans-Kenner road operates between New Orleans, in Orleans Parish, and Kenner, in Jefferson Parish.

Traffic and Transportation

Consent Unanimous

All Factions in Boulder, Col., Back Railway's Petition for Rate Increase—New Fare 10 cents

A spirit of co-operation between city and railway marked an increase in fare in Boulder, Col., on Jan. 7. The city authorities after a thorough investigation of the local traction situation authorized the Western Light & Power Company to raise the fare from 5 cents to 10 cents for adults and from 3 cents to 5 cents for children. In so doing they took occasion to commend the railway for the quality of service furnished on its Boulder lines.

BUSINESSLIKE PROCEDURE

The city of Boulder in under the city manager form of government. It is one of the six home-rule cities of Colorado, which, by a recent decision of the State Supreme Court, have jurisdiction over rates charged by the public utilities operating within their limits. Scott Mitchell, the City Manager, is a civil engineer by profession, and before taking his present position engaged in engineering work for a number of years.

The railway petitioned the Mayor and the City Council to be allowed to raise its rate. It submitted a valuation of its railway property, the revenues of the same, and the cost of operation for a period of five years, showing a considerable loss from the operation of the railway department. The valuation was referred to City Manager Mitchell. After a close examination of the data, Mr. Mitchell approved the valuation and report as submitted and recommended to the Mayor and the City Council that the higher fare be granted. Mr. Mitchell also commended the company for the excellent manner in which it presented its case.

At a meeting of the Council early last December the petition was read and an ordinance initiated by the city attorney granting the fare sought by the company and repealing the nickel rate then in effect. The ordinance was passed unanimously and according to law was published for ten days in the newspapers to give time to any person who wished to protest against the proposed increase. No protests being made, the Council at its next meeting gave its final approval to the fare increase.

NEWSPAPERS BACK RAILWAY

The ordinance was then published for thirty days, according to law, so that any persons who wished to initiate a referendum might do so. This time passed without anyone protesting or preparing a referendum petition, and at the end of the thirty days, on Jan. 7, the measure took effect. At the time of the final passage by the City Council a similar petition for increase in fare was filed by the company with the Public Utilities Commission of Colorado, which gave its approval of the increase as a matter of course.

The two Boulder daily newspapers indorsed the increase in rates editorially, and also asked the people to patronize the railway under the new schedule. The newspapers also requested automobile owners not to pick up potential railway riders and carry them free of charge. Editorials in the dailies pointed out that the community could not expect the railway to continue operating if it did not receive a fair return on its investment.

In asking higher fares the railway showed that there was a pleasure automobile to every six inhabitants of the city and that as the streets were always good for travel by the automobiles there was not so much necessity for the operation of the railway as there had been previous to the coming of motor transportation. It pointed out that the great increase in the number of automobiles had made serious inroads upon its revenue. The electric light and power and the railway franchises are combined, but the company explained that it considered it unfair to have the users of electric light and power bear the burdens of the deficit in the railway department.

Eight-Cent Fare Denied in Raleigh

An application of the Carolina Power & Light Company, Raleigh, N. C., for permission to charge an 8-cent cash fare with four tickets for 30 cents on the Raleigh city lines, has been dismissed by the North Carolina Corporation Commission. The commission points out that the tendency of operating costs is now downward and that it does not deem it wise at this time to grant the increased rate demanded. The commission directs the company to furnish to the Mayor of Raleigh on the first day of February, March, April and May of this year a detailed statement of operating revenues and costs and orders the city of Raleigh to show cause on May 3 next, before the Corporation Commission why an order increasing the present rate should not be made. At present the fare is 7 cents with four tickets for 25 cents.

The commission's order reads in part:

> It appears to the commission that the petitioner is not now receiving a sufficient income from passenger fares to provide a reasonable profit on the investment made and that even at a rate of 8 cents it could not earn at the present cost of operation, over 3 per cent. However, our commission is bound to take judicial notice of the fact that the tendency of operating costs is downward, and it does not deem it wise at this time to grant the increased rate demanded.

Weekly Pass in Kenosha

Success of Racine Experiment Prompts Extension of Idea of Unlimited Weekly Rides for $1

The Wisconsin Gas & Electric Company, operating the local railway in Kenosha, Wis., announced that beginning Jan. 20, 1921, its patrons would be able to buy a transferable "weekly pass" for $1. The pass will be good for an unlimited number of rides during the seven days beginning each Monday. Only one person will be permitted to use the pass at a time. The cash fare on the Kenosha lines is 7 cents, with four rides for 25 cents. These rates took effect Oct. 30 last.

BIG AID TO CAR OPERATORS

A passenger upon boarding a car will merely show the pass to the conductor and proceed inside. This will eliminate the necessity of making change or the giving of transfers. Incidentally it is expected that the use of the pass will help speed up the service. Kenosha is an industrial city of some 40,000 population. The base service is now being rendered by one-man cars. The passes will be on sale by the conductors or at the headquarters of the railway in the Public Service Building. They will be of pasteboard, of the usual pass size and form, will be dated and numbered and will bear appropriate wording.

Kenosha is the second city in the United States to have the "weekly pass." The plan was originally introduced in August, 1919, in Racine, Wis., by the Milwaukee Electric Railway & Light Company, which operates the railway in Racine. It proved a big success and the Racine City Council has urged that it be continued there permanently. The Wisconsin Gas & Electric Company and the Milwaukee Electric Railway & Light Company are both subsidiaries of the North American Company.

"EVERYBODY'S RIDIN'"

In its announcement introducing the "weekly pass," the Wisconsin Gas & Electric Company points out that the use of the passes will save the public time and money in that it will enable people to use the street cars for all traveling about the city without extra expense. The announcement by the company, in pointing out the advantages of the scheme, says:

> The theory of the Weekly $ Pass is that the regular customers of the car lines should be entitled to lower rates than others.
>
> No one who lives in Kenosha needs to pay a 7-cent fare. If you ride only eight times a year you can buy eight tickets for 50 cents. If you or members of your family ride every day the Weekly $ Pass will give you the cheapest possible fare and unlimited use of the cars.
>
> You will soon get the habit of using your pass to ride two or three blocks. When it is raining, cold, slushy or snowing—what a boon the Weekly $ Pass is then. Your family will get more than $1 worth of rides on weekdays. Your extra daily rides and your evening and Sunday trips are really free. There will be no need to stay downtown for lunch. With the Weekly $ Pass in your possession it will be cheaper to go home than to eat downtown. If you are not using your pass loan it to a friend. It is transferable.

Dime Fare Refused as Prices Fall

New York Commission Holds 10-Cent Rate Unjustified in Albany, but Allows 8-Cent Fare—No Increase in Troy

Basing its stand on the assumption that the peak of operating costs has been passed and that expenditures for wages and maintenance and supplies will recede on the average 15 per cent during the present year, the Public Service Commission for the Second District on Jan. 21 refused to allow the United Traction Company, Albany, N. Y., to raise the fare on its lines in Albany from 7 cents to 10 cents. An 8-cent cash fare with four tickets or tokens for 30 cents was authorized for the Albany lines. The commission denied the application for an increase in the Troy zone, where a 7-cent fare is now charged, and fixed 5 cents as the rate for local rides in the city of Rensselaer and 6 cents for rides between that city and the Plaza in Albany. The new rates take effect Jan. 29.

THE commission discusses the prospective decline in operating costs as follows:

> It appears that wages have increased enormously during the war reconstruction period. We do not believe the commission can assume that the present scale is to continue. It is evident the company is unwilling to continue it under the present rates of fare, and the existing agreement seems to assume that unless the fares are increased the present scale will not continue. The rate increases granted by the commission in 1918 and 1920 have been more than absorbed by the increased wage scales. In substance, therefore, the commission in the last two rate orders as well as in the order about to be made has been and is dealing not with return on the company's investment but with wages of the employees.
>
> It is a matter of general knowledge, of which the commission may properly take notice, that the costs of both labor and materials, which have so sharply advanced within a brief period, have begun to decline. The apex seems clearly to have been passed. In view of this condition and of the terms of the last wage agreement of this company we do not feel justified in fixing rates upon the assumption that the present wage scale of the company will continue any considerable time. It may be that wages will not decline as rapidly as they have advanced, but it seems clear that they cannot remain at the present point when the general cost list is receding.
>
> The same may be said of operating and material costs in general. It is a serious proposition to increase rates of fare in the face of declining costs of other commodities. It may be asserted that the subjects adverted to are for the consideration only of the directors of the corporation and that the sole province of the commission is to award a rate which will pay a reasonable return on investment based on proven costs. We think, however, that this is too narrow a view. The commission's powers are not exclusively judicial. They are also administrative and quasi-legislative. They must needs be administered with these truths in view by reason of the extremely practical problems which are presented to it for determination. Under the circumstances we think we must assume, in arriving at an estimate of expense for the coming year, that the trend of wages and other expenses will be downward.

REASONS FOR 8-CENT FARE

The commission's opinion, after citing estimates of operating expenses, says:

> Assuming these computations to be correct and that the commission's estimate of operating expenses on the average during the period covered by the order to be made is justified, no increase in the Albany zone should be made.
>
> The result arrived at, however, is deduced from many estimates and allocations and the tracks in the town of Colonie have been treated as incidental to the Albany property. It is realized also that the treatment of the Rensselaer traffic ignores the part of the traffic west of the Albany Plaza. Furthermore, the commission need not limit the rate of return 8 per cent.
>
> An increase in the cash fare in the Albany zone, including passengers between Albany and Rensselaer who travel in either direction west of the Plaza in Albany, from 7 cents to 8 cents, with the option to the rider of purchasing from conductors on the cars four tickets for 30 cents will yield the company somewhat over 7½ cents per passenger. Assuming a slight falling off in traffic this increase will amount to, say, $120,000. This seems a reasonable solution of the problem in the Albany zone.

The refusal of the commission to grant any increase for Troy and Rensselaer was based on franchise agreements which these cities have with the company, limiting the fare to 5 cents. The city of Troy had agreed to increase the fare to 6 cents and later to 7 cents, but the Common Council refused to agree to any further advance. The city of Rensselaer agreed to a 7-cent fare for a period expiring this month. The commission therefore ordered a reduction to 5 cents within the limits of the latter city and to 6 cents in the Rensselaer-Albany zone.

In applying for relief the company stated that for the first eight months of the year 1920 its revenues and expenses, exclusive of the operation of the Hudson Valley Railway, were as follows: Railway operating revenues, $2,129,729; expenses and taxes, $2,111,072; operating income, $18,657. A substantial wage increase took effect on July 1 last, so that from that time forward the showing was even worse. The company's estimate for the last four months of 1920 indicated an operating deficit of $128,721, or a total deficit for the year of $11,064. None of these figures include charges for interest or return on investment.

Worcester's Need Urgent

The Massachusetts Department of Public Utilities on Jan. 20 heard arguments on the application of the Worcester Consolidated Street Railway for a straight 10-cent fare with free transfers, instead of the present 7-cent zone system, on its Worcester city lines. The company also asks an increase on its suburban lines from 6 cents to 7 cents in each zone. Bentley W. Warren, counsel for the railway, opposed the continuation of the zone principle in Worcester. Mr. Warren said:

> In Worcester we have tried the five-and-five-cent fare, the six-and-six, and finally the seven-and-seven-cent fare now in operation, and none of them has produced the money necessary to operate the road and keep it up in repair as any road should be kept up. * * *
>
> So far the Worcester Consolidated has hardly been able to exist, its problem having been an endeavor to keep up with the band wagon which has been driven by its employees.
>
> I do not maintain that the increased fare we ask is due entirely to the added burdens which have been placed upon us by reason of the constantly increased wages which have been granted, but that item has been a big factor. Another increase in wages goes into effect in July and the road simply must have the revenue to meet its running expenses or it must be given up. * * *
>
> It is not a question of continuing the present seven-cent fare but rather a question of increasing the annual operating revenue by at least 500,000.
>
> The last dividend paid by the road was in 1917 and since that time it has been receiving barely enough revenue to enable it to meet its interest and tax bills.

Mr. Warren stated it is estimated the passenger revenue would be increased under the new fare schedule $769,876 during the next twelve months. Referring again to the wage question he stated the pay roll for 1921 based on the same amounts for operation as last year, will exceed $2,600,000. An increase of more than $219,000 over last year is due to the increase in wages.

Louisville Increase Again Refused

The City Council of Louisville, Ky., on Jan. 25 rejected by a vote of 18 to 2 an ordinance granting the Louisville Railway an increase in fare from 5 cents to 7 cents. The Council took this action regardless of the fact that the Board of Alderman had previously passed the measure. The defeat of the higher fare proposition followed closely the reading of a protest from the local carpenters' union against increasing the rate. This protest stated that the carpenters of Louisville had decided not to ask for an increase in wages and quoted a statement of the Employers' Association of Louisville relative to a general decline in commodity prices.

This protest was greeted by the spectators at the Council meeting with vigorous applause. When the ordinance came up the Council was in no mood to consider it favorably. Officials of the Louisville Railway stated on Jan. 26 that their next move had not been decided upon but would probably be announced in a day or so. It is improbable that any further effort will be made at this time to get another ordinance through the Council. One official of the company declared recently that if the ordinance failed of passage service would undoubtedly be curtailed, since it would be utterly impossible to continue to furnish the present service at a nickel fare.

Dime Fare Made Permanent

The Illinois Public Utilities Commission has issued an order making permanent a fare advance to 10 cents on the lines of the Chicago Elevated Railways with the continuation of the sale of four tickets for 35 cents.

The order disclosed a fixed valuation for the company's property of $86,250,000, which contrasts with a total funded and floating debt of $66,732,500. The commission estimates the earnings on that property valuation as $3,647,000, or 4.23 per cent, although it admitted that the percentage return ought to be as high as 7½ per cent. The commission's findings are discussed at greater length on page 241 of this issue.

Transportation News Notes

Dime Fare in St. John.—The New Brunswick Power Company, St. John, N. B., on Jan. 3 raised the cash fare on its St. John lines from 6 to 10 cents. Three tickets are sold for 25 cents.

Tokens in Wilmington.—Metal tokens have replaced strip tickets on the lines of the Wilmington & Philadelphia Traction Company, Wilmington, Del. The outstanding paper tickets will be redeemed at the company's office.

Six Cents in Newark.—The City Council of Newark, Ohio, has passed an ordinance authorizing the Ohio Electric Railway, Springfield, to charge a 6-cent fare on its Newark lines. The new rate is to continue until Jan. 1, 1922. The fare has been 5 cents.

Eight Cents in Las Vegas.—The Las Vegas (N. M.) Transit Company on Jan. 1 raised its fare from 6 cents to 8 cents. The increase was authorized by the State Corporation Commission. The company in requesting an increase showed that it had been operating at a considerable financial loss.

Six Cents in Decatur.—The Decatur Railway & Light Company, Decatur, Ill., has been authorized by the State Public Utilities Commission to charge a 6-cent fare on its Decatur lines. The fare has been 5 cents. The city authorities have announced their intention to appeal to the courts from the commission's rate ruling.

Ten Cents in Ardmore.—The Oklahoma Corporation Commission has authorized the Ardmore Railway to raise its cash fare within the Ardmore city limits to 10 cents. Testimony at hearings before the commission showed that the company was losing between $100 and $400 a month. The new rate is to take effect at once.

Seven Cents in La Crosse.—The Wisconsin Railway, Light & Power Company, La Crosse, Wis., has raised the fare from 6 cents to 7 cents on its La Crosse lines under authority of an order issued by the Wisconsin Railroad Commission. The company has raised the price of monthly ticket books good for fifty rides from $2.75 to $3.

No Increase in Wichita Falls.—The City Council of Wichita Falls, Texas, has refused to grant a petition of the Wichita Falls Traction Company for a 7-cent fare. The railway raised its fare last October from 5 cents to 6 cents. The Council considered a further increase unnecessary in view of recent recessions in the prices of supplies.

Alabama Road Charges Eight Cents.—An order has been issued by the Alabama Public Service Commission permitting the North Alabama Traction Company to increase its fares in Albany and Decatur to 8 cents. A tentative increase was allowed the company some time ago pending the submission of all facts.

Patrons Approve Higher Rate.—The patrons of the Nahant & Lynn Street Railway, Lynn, Mass., have approved an increase of 3 cents in the fare charged by the company. The new rates will be 13 cents for a single trip and 25 cents for a return trip, with nine rides for $1. The company sought a 15-cent rate. The fare has been 10 cents.

Seven Cents in Tulsa.—The Tulsa (Okla.) Street Railway on Jan. 10 raised its cash fare from 5 cents to 7 cents by authority of the State Corporation Commission. Four tickets are sold for 25 cents. The company is directed to take immediate steps to improve its service. The city of Tulsa contests the right of the commission to grant the higher rates.

Hearing of Trenton Case Put Off.—The New Jersey Board of Public Utility Commissioners has indefinitely postponed hearings on the application of the Trenton & Mercer County Traction Corporation, Trenton, for an increase in fare. This step is taken because of the uncertainty regarding the status of the present members of the board. The company is seeking to raise its fare from 7 cents to 10 cents.

Zone Fare Eight Cents.—The Public Service Commission for the Second District on Jan. 18 authorized the Troy & New England Railway, Troy, N. Y., to raise the fare in each of the three zones into which its line is divided from 6 cents to 8 cents. The railway showed a deficit of more than $4,600 in 1920. The company has never paid a dividend and its total deficit now amounts to upward of $32,000.

Three Cents a Mile Asked.—A new rate schedule of 3 cents a mile in the place of the present one of 2½ cents, has been filed with the State Board of Public Utility Commissioners by the Public Service Railroad, Newark, N. J., which operates the "Fast Line" between Newark and Perth Amboy and between Milltown and Trenton, with branches to Chrome, Sewaren and other communities. The road is a subsidiary of the Public Service Corporation.

Seven Cents in Colorado Springs.—Fares on the city and suburban lines of the Colorado Springs & Interurban Railway, Colorado Springs, Col., were raised from 6 cents to 7 cents on Jan. 6 as the result of an order issued by the State Public Utilities Commission. The railway was directed to sell eight tickets for 50 cents instead of nine for 50 cents. The increase in fare was authorized several months ago by the City Council.

Needs More in Mansfield.—The Richland Public Service Company, Mansfield, Ohio, has made application to the local City Council for an increase in fares from 7 cents cash, four tickets for 25 cents to 10 cents cash, four tickets for 35 cents. On the present rate the company is not making expenses. According to a provision of the franchise, if an agreement is not reached between the city and the company within forty-five days, the new rate of fare goes into effect automatically.

Would Charge 10 Cents.—The Choctaw Power & Light Company, which owns and operates the electric railway system in McAlester, Okla., has made application to the Oklahoma Corporation Commission for authority to increase fares from 5 cents to 10 cents. It is claimed in the petition that the 5-cent rate is entirely inadequate and that the company faces curtailment of service or bankruptcy if this fare is imposed. The commission has taken the application under advisement.

Court Sustains Indiana Commission.—The Circuit Court sitting at Hartford City, Ind., has dismissed a suit of the Board of Commissioners of Grant County, Ind., against the Indiana Public Service Commission. The board sought an order to set aside a ruling of the commission fixing rates of the Union Traction Company, Anderson, between Marion and Jonesboro, Ind. The court's ruling followed a decision of the Indiana Supreme Court holding that the commission had authority to abrogate local franchises.

No Sunday Cars in Brantford.—By a vote of 2,725 to 2,534 the ratepayers of Brantford, Ont., have defeated a proposal to have Sunday cars operated on the municipally-owned railway system. Many of the ratepayers opposed the innovation because of the extra expense involved. St. Thomas, Ont., recently voted for Sunday cars. The system is municipally owned but has never been a paying venture. The ratepayers of Peterboro have approved a by-law providing for Sunday operation of the cars of the Peterboro Radial Railway.

Riders Resent Rate Plea.—Patrons of the Poughkeepsie & Wappinger Falls Railway, Poughkeepsie, N. Y., have adopted the slogan, "We Walk," as a protest against the action of the railway in petitioning the Public Service Commission for the Second District for an increase in fare from 7 cents to 10 cents. Under direction of Charles H. Case, Alderman from the First Ward, walking clubs have been organized in every ward in the city, as well as at the other points outside the city served by the company. Buttons bearing the slogan of the clubs have been ordered, and a general strike against the railway is said to be contemplated.

Bill for Five-Cent Fares.—A bill fixing the rate of fare on the railway lines in Milwaukee, Wis., at 5 cents has been introduced in the Wisconsin Legislature by Assemblyman M. M. Higgins. The bill deprives the Wisconsin Railroad Commission of authority to fix rates in Milwaukee. Mayor Daniel V. Hoan of Milwaukee is reported to have commented as follows upon the bill: "The people of Milwaukee can get a 5-cent fare only through municipal ownership of the railway lines and it might not come immediately even in that way, as it would have to depend upon the cost of operating the lines."

Nickel Now in Nelson.—After operating for eight months at a 4-cent fare the Nelson (B. C.) Street Railway has returned to the former nickel rate. The 4-cent fare experiment resulted in an increase in the number of passengers carried of 45,000 over the same period a year ago. The receipts also showed a gain of about $1,000. The City Council has directed a return to the 5-cent fare to see if the traffic will be affected. The railway is municipally owned and operated and serves a community of about 4,500 persons. Mrs. W. G. Foster, a member of the Board of Aldermen, is chairman of the street railway committee, and was the sponsor of the 4-cent fare.

Traffic Survey for the City of Nashville. — The City Commissioners of Nashville, Tenn., have engaged the services of Ross W. Harris as traffic expert to make a survey of the railway conditions of the Nashville Railway & Light Company in accordance with the order of Tennessee Railroad & Public Utilities Commission. The survey will be started at once. The streets in the business district of the city are exceptionally narrow and become very congested during the rush hours. One-way traffic laws are in effect on many streets for railway and vehicular traffic. It is thought that there is some method by which traffic congestion can be avoided or at least mitigated by widening the streets or by rearranging the traffic.

Mayor Vetoes Lima Fare Bill. — Mayor F. A. Burkhardt, of Lima, Ohio, has vetoed an ordinance passed by the City Council on Jan. 3 authorizing the Ohio Electric Railway to continue to charge a 7-cent cash fare within the Lima city limits for a period of six months after Feb. 1. The 7-cent fare took effect on Sept. 1 last. The company has been selling nine tickets for 50 cents. In his veto measure Mayor Burkhardt points out that the temporary franchise granting a six months' extension did not provide for improvement in the service. He urges the Council and the company to get together in working out a permanent franchise, so that improvements in the service will be assured.

Seven Cents Asked in Dallas.—A straight 7-cent fare to become effective immediately and to remain in effect until a new service-at-cost franchise is granted or the accumulated deficit is wiped out, has been asked of the Board of Commissioners of Dallas, Texas, by Richard Meriwether, general manager of the Dallas Railway. If the fare is granted the company makes a commitment to borrow $138,000 from local banks with which to carry out the South Lamar Street track rebuilding and paving project and expresses the belief that the increased fare will re-establish the credit of the company to such an extent that it will be able to secure the loan. The railway is now charging a fare of 6 cents. Mr. Meriwether's letter to the City Commission was published in detail on page 196 of last week's issue.

Court Stays Rate Action.—Judge K. Rockwell recently handed down an order staying all proceedings against the Detroit (Mich.) United Railway by the townships and communities which began a suit to compel return to franchise rates of fare, in spite of increased allowances under the so-called Smith act. The action is on motion by the Detroit United Railway and in accordance with a suggestion of Prosecutor G. C. Gillespie, who informed the court he could in that way take the matter direct to the State Supreme Court or the United States Supreme Court, if the latter step were necessary. The Smith act allows interurban railroads earning less than $8,000 a mile to charge a rate of 2.5 cents a mile. Under the terms of the law the Detroit United some time ago raised the fare on several of its interurban lines to a basis of 2 cents a mile.

Nine Cents in Rock Island.—Fares on the Illinois side of the Mississippi River on lines operated by the Tri-City Railway were increased on Jan. 12 from 8 cents to 9 cents. The new rate affects Rock Island, Moline and East Moline and several adjacent villages. Last July the company applied to the State Public Utilities Commission for an increase from 7 cents to 10 cents. The 8-cent fare was granted temporarily by the commission. After the court decision had allowed the company a nine-cent fare on the Iowa side of the river (Davenport and adjacent towns) a hearing was held by the commission in September. Commutation tickets, giving the passenger a ride from any part of the Illinois territory to any part of the Iowa territory served by the company are now 18 cents, as compared to 16 cents formerly. School children are carried for 4 cents each.

Street Collection in Dallas.—The Dallas (Texas) Railway has stationed fare collectors on the sidewalk near the safety zones in the downtown section of the city. During the morning and evening rush hours the company has additional collectors within the safety zones as a means of further speeding up traffic. The collectors on the sidewalk receive fares and issue receipts which are taken up by the collectors within the safety zones. This practice enables passengers to purchase receipts during off-peak hours and to board the cars without loss of time. Under the former systems the fare collector within the safety zone was sometimes swamped when a number of persons sought to board a car at the same time. The company has placed metal tokens on sale at the inspectors' booths in the downtown business section. The price of each token is 6 cents, the same as the cash fare.

A Splendid Safety Record.—Though rails were slippery and consequently cars *would* bump, the record of the Michigan Railway during its "No Accident Week" will go down in history. With but single exception the railway company was 100 per cent perfect on safety from Jan. 1 to Jan. 7 inclusive. At Battle Creek the fatal accident occurred—fatal in the sense that a record was marred though no life was lost. The powers that be proclaim that bumping cars constitute a serious mishap. But if rails are slippery who is to blame? The vice-president and general manager of the company doesn't blame anyone at all, but has sent a letter to local employees in Jackson in which he extends the management's appreciation to all employees and the public in general who co-operated in the accident prevention campaign, and expresses the hope that this campaign has been the means of bringing caution more emphatically to the attention of the public.

Six Cents in Charleston.—The Charleston-Dunbar Traction Company, Charleston, W. Va., has been authorized by the West Virginia Public Service Commission to raise its fare within the Charleston city limits and between Charleston and Dunbar. Increases in operating expenses and taxes were among the reasons cited by the commission in granting the higher rates. It was stated that the railway's operating costs had been increased $7,200 a year by a wage increase allowed employees last July. The company declared that it would require an income of $7,500 a year greater than in 1920. The new rates, which will remain in effect until Jan. 1, 1922, are as follows: In the city of Charleston, 6 cents; between the city limits and Lock Six, 6 cents; between Lock Six and Dunbar, 6 cents; between Charleston and Dunbar, 18 cents; nine tickets in strip for 50 cents; commutation tickets, 14 cents each in strips of ten or multiples thereof, good between Charleston and Dunbar; commutation tickets good between Charleston and Lock Six, 10 cents each; school tickets, forty for $1.20.

Would Charge 10 Cents in Utica.—The New York State Railways, Syracuse, has filed an application with the Public Service Commission, Second District, for a rate of fare of at least 10 cents instead of the present rate of 6 cents on its lines in Utica. The company, in its application, refers to the 33⅓ per cent increase in wages under an award on July 1, retroactive to May 1, claiming that prior to making this award the rate of fare was not adequate to meet the cost of operation and provide the company with a fair return. The company alleges that if the present rate of fare and the present wage schedules were applicable for the year Oct. 31, 1919, to Oct. 31, 1920, the operating loss to the company would be $146,784. For the six months ending Oct. 31, 1920, the operating loss was $87,095. For the year ending Dec. 31, 1919, the first full year of the 6-cent fare, the operating loss was $6,129. The company says a 10-cent fare, based on operating results for the year ending Oct. 31, 1920, will give the company a fair return on an investment of $6,221,279.

Personal Mention

H. S. Sweet, Engineer of Equipment

Harrison S. Sweet, heretofore master mechanic, New York State Railways, Utica lines, has been appointed to the newly-created position of engineer of equipment and shops of the New York State Railways System. Mr. Sweet will be associated with J. F. Uffert, superintendent of equipment, in supervising the maintenance of the railway's rolling stock. His duties will consist largely of the standardization of parts and car equipment and of other engineering work in connection with the equipment and shops.

F. L. McCann has been appointed master mechanic of the Utica lines, succeeding Mr. Sweet. Mr. McCann has been connected with the equipment department of the system for a number of years.

Mr. Sweet was graduated from Bucknell University in 1912 as an electrical engineer, subsequently spending about a year with the General Electric Company in laboratory and test work. He became connected with the New York State Railways in 1913.

C. Hackel, Chief Engineer

Charles Hackel, New York, has been named chief engineer for the Trenton & Mercer County Traction Corporation, Trenton, N. J., and has entered upon his new duties. Mr. Hackel is a native of Switzerland. He came to the United States at the age of ten years and located in New York City. He attended the grammar schools and a high school there and later entered the employ of the Consolidated Gas Company, New York. While engaged in this line of work he took a course in engineering at the Cooper Union, and was later made engineer at the Consolidated company's plant. After remaining there for seven years he accepted an appointment to the Western Electric Company in New York City. He was employed by that company for more than five years.

P. W. Pierson Promoted

P. W. Pierson, formerly seretary to Richard E. Danforth, vice-president and general manager of the Public Service Railway of New Jersey, has been promoted to the position of executive assistant to Mr. Danforth. Mr. Pierson is a graduate of the Rider, Moore & Stewart College and the Horton-Large Business Institute. He began his railroad career in 1903 with the Pennsylvania system, New York Division, in the operating and traffic departments. In 1905 he entered the employ of Public Service under Albert Stanley, then general manager of the property, and now, as Lord Ashfield, chairman of the London Underground Railways. Serving in the capacity of secretary and executive clerk, Mr. Pierson has worked his way up to his present position, in which he is charged with many responsibilities in the operation and maintenance of the Public Service properties.

W. Whiteford, Manager

Purchasing Agent of the Twin City Rapid Transit Company Succeeds Foster Hannaford, Resigned

William Whiteford, purchasing agent of the Twin City Rapid Transit Company, Minneapolis, Minn., has been promoted to acting general manager of the system to fill the vacancy caused by the resignation of Foster Hannaford. Mr. Hannaford is leaving the Twin City system to go into the mercantile field as vice-president of the firm of Noyes Brothers & Cutler, of St. Paul.

WILLIAM WHITEFORD

P. J. Metzdorf, for many years superintendent of parks for the Twin City lines, has been named assistant to the general manager. Mr. Metzdorf will make his headquarters in St. Paul.

Mr. Whiteford entered the service of the Twin City lines in August, 1903. His duties were those of extra clerk in the auditor's office. He was required to acquaint himself with the duties of the other members of the force, and to act as utility man whenever a temporary vacancy occurred. This proved to be the best kind of training for his later advancement.

In the spring of 1904 the general offices of the railway were moved to their present location at Hennepin Avenut and Eleventh Street, Minneapolis. Mr. Whiteford worked there for two years. In 1906 it was decided to return to the shops at Blaisdell Avenue and Thirty-first Street a portion of the auditor's work. Mr. Whiteford at that time became chief clerk of the shop accounting department. In 1907 he was appointed general storekeeper in charge of material and accounts. When in 1908 the company's shops were moved to University and Snelling Avenues, St. Paul, Mr. Whiteford established his office there.

Mr. Whiteford's next promotion came in 1914, shortly after George H. Hayes resigned as purchasing agent of the company to become comptroller at the University of Minnesota. The purchasing department was moved from the general offices and consolidated with the stores department at the Snelling shops, Mr. Whiteford being placed in charge. He held this position until his recent appointment as acting general manager of the Twin City lines. He was a member of the board of arbitration appointed to adjust the question of wages of the employees of the St. Paul City Railway.

Mr. Whiteford was born in Ardrossan, Scotland, in 1880. He came to the United States when he was eight years old and was educated in the Boston public schools. In December, 1900, he removed to Minneapolis, and for about two years worked for the Minneapolis Dry Goods Company.

Mr. Libbey Leaves Railway Work

J. H. Libbey, until recently electrical engineer of the Eastern Massachusetts Street Railway, Boston, Mass., has joined the organization of H. M. Haven & Wm. W. Crosby, engineers and architects, Boston. Mr. Libbey is widely known in electrical circles in New England. He was graduated in mechanical engineering in 1898 from the Lawrence Scientific School of Harvard University, and for a time was employed by the Bethlehem Steel Company, Bethlehem, Pa., in connection with high-speed tool steel development work under F. W. Taylor. For four years he was in the engineering organization of Westinghouse, Church, Kerr & Company at New York and Boston, and his early work included power plant development and construction on the Boston & Northern Street Railway, whose lines are now a part of the Eastern Massachusetts system.

During the period of design and construction of the electrified zone of the New York, New Haven & Hartford Railroad Mr. Libbey was assistant electrical engineer under W. S. Murray. He resigned from this post to join the engineering organization of Stone & Webster at Boston, Mass., with whom he remained for seven years. With that company his work embraced a variety of engineering problems including central station and power plant work, transmission and appraisals. For the past seven years he has been electrical engineer for the Bay State Street Railway, now the Eastern Massachusetts Street Railway. He had entire charge of the power supply on that property.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER,
SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Some Spring Buying of Station Arresters Reported

Shipments Up to Two Months Ruling, Bringing Deliveries Up to Beginning of Storm Season

With shipments of the station type of lightning arresters running up around four, six and even eight weeks, depending upon the type of arrester and on the manufacturer, it does not seem to be too early to consider the advisability of placing orders for delivery and installation before the spring storms may be expected to set in. Parts for repair purposes and for replacements require virtually the same length of time.

Buying has not been heavy for this equipment, but already many companies have made known their needs and are awaiting shipment. Other companies are still behind and run a chance of having their equipment held up by longer deliveries if they put off their ordering until the factories begin to fill up their production capacity. There is reported a shortage in high-voltage porcelain for use with lightning arresters of the station type, and this is not surprising when the long deliveries of regular high-tension porcelain insulators are considered.

Calder Coal-Control Bill Is Securing Consideration

Opinion Expressed that Coal Business Should Be Put in Same Category with Public Utilities

While there is virtually no chance for any legislation at this session of Congress providing for federal regulation of the coal industry, the passage of the packers' bill and the hearings before the Senate committee on manufactures have had the effect of bringing about serious consideration of the Calder bill. This measure provides a rather drastic form of coal control in times of emergency, authorizes price fixing and the licensing of all those engaged in the trade. A permanent feature would be the compulsory filing of costs and profits and other statistical data, which would be made public in a way that would permit the consumer to analyze his coal costs.

Dr. George Otis Smith, director of the United States Geological Survey, told the committee on manufactures that the coal business could no longer be considered a private one. He expressed the opinion that it should be placed in the same category with the public utilities.

At the request of the committee, George W. Elliott, secretary of the National Committee on Gas and Electric Service, spoke to the following effect:

"The public utilities have suffered tremendously for the past year in their coal supply, principally through the flagrant disregard of contract obligations on the part of the coal operators. The public utilities consume annually 50,000,000 tons of coal. Much of this tonnage is contracted for yearly in advance. Coal that should have been furnished to public utilities in compliance with the contract obligations apparently was diverted to the spot market, where prices could be obtained far in excess of those stipulated in the various contracts. The alternatives of going into the open market would have been to curtail their output or to close their plants."

Mr. Elliott was not asked his opinion as to whether the Calder bill would remedy the situation and vouchsafed no opinion. It was made clear to the committee by him that the National Committee on Gas and Electric Service had held aloof from all matters concerning prices. Its activities in Washington had been confined generally to securing and expediting shipments of coal that already had been contracted for.

Quiet Market for Special Trackwork

Electric Railways Not Covering Spring Needs—Deliveries Are Good, with Lower Prices on Standard T-Rail Layouts, but No Reduction on Girder Rails

The market for special trackwork on the whole remains comparatively quiet. Steam roads are placing orders for standard T-rail frog and switch work in a fair volume. The large orders for straight rail sections already placed by the more important roads naturally have to be supplemented by special trackwork material for use in making replacements. Consequently some of the frog and switch shops report that they are keeping busy. Others have found it necessary to reduce working forces. Wage reductions in some instances are reported too.

Electric railways just now are not large factors in the special trackwork market. The tendency to hold off on placing orders that has been previously noted continues strongly. Perhaps in view of this tendency, the present year may yet see a good volume of business placed. In fact, if traction companies crowd into the market with late orders at the same time, it is very possible that deliveries may be pushed, especially on girder rails. This is because girder rail mills are pretty well booked up with orders for straight rail sections covering the spring season, and difficulty in obtaining a rolling in a hurry might be experienced.

This possibility is further enhanced by the policy of special trackwork manufacturers of not laying in a very large surplus supply of rails. The experience of more than one producer with standard T-rails which were bought at $57 a ton and had to be sold in the finished product on a $47 a ton basis under competition furnished a lesson in that respect. At present deliveries of frog, switch and crossing work are entirely favorable. If no undue change occurs in the market the likelihood is that they will remain so.

Prices on standard-rail layouts have been reduced in the same proportion as the recent settling of steel rail prices to the $47 a ton level. Girder rails, however, have not been reduced in price so far as can be learned. Consequently, girder-rail frog and switch work, while possibly shaded in price from the peak quotations, have not undergone any decided reduction. As so many other considerations enter into the manufacture of that class of material besides the basic cost, it may be long before any reduction can be made. In view of the downward trend to the steel, fuel and labor markets, however, the ultimate price tendency would seem to point to lower levels on girder rail layouts too.

Normal Replacement Orders for Brake Shoes

Slight Price Reduction Since First of the Year—Orders Can Be Filled from Stock

Current buying of brake shoes is lighter at this time of the year, possibly because not so many cars are in operation as during other seasons, and replacements are consequently less. Comparatively few new cars are being built too, although this source of demand is not an especially large factor in the business at any time. Electric railways are maintaining their brake shoe equipment in good shape, however, and buying on behalf of replacements, it is stated, is up to the standard of other years. Orders from steam roads, on the other hand, it is reported, are not so satisfactory.

Stocks of the finished product with manufacturers are not large, but are such that reasonable orders can be filled from stock. It is the policy of brake shoe manufacturers to maintain fairly large raw material stocks with which to replenish supplies of the finished product, but at the present time this surplus supply is probably lower than usual because the declining condition of the market induces cautious buying of material.

Prices have been reduced on brake shoes slightly since the first of the year. The reduction was brought about by lower prices of coke, pig iron, etc.

Copper Below Ten-Year Pre-War Average

To Keep Manufacturing Costs Low Present Would Seem to Be Time to Buy Red Metal

From the accompanying figures compiled by the *Engineering and Mining Journal* there is shown very clearly the course taken by copper during the year just passed. These figures give the average prices for each month of electrolytic copper f.o.b. refinery. The present spot market is quite inactive, and producers are holding at a nominal price of 12.75 cents.

January	18.92	July	18.58
February	18.57	August	18.35
March	18.33	September	18.14
April	18.66	October	15.93
May	18.48	November	14.26
June	18.07	December	13.19

On all sides is heard the criticism that prices of materials are far above pre-war prices. Copper is now quoted well below the average of the ten years before the war, which was approximately 15 cents, delivered. Indications seem to point to a slowly advancing price. Improvements in foreign exchange are expected to assist buying greatly. Manufacturers who expect to build up rapidly a future trade by lower costs must, it would appear, insure themselves against higher cost of raw materials by taking advantage of rock-bottom prices. There are many indications to encourage belief that copper is now lower than it will be at any other time, certainly during the coming year.

Quiet Market for Tubular Steel Poles

There is little activity in the tubular steel pole market at this time, although tubular products in general are responding to pretty good buying. This is making rather long shipments, up to four and six months being quoted. A recession in price of $15 a ton was put into effect about the middle of January by one of the steel tube plants not in the corporation, bringing this outside price nearer to corporation levels. Previous inquiries are being refigured on the basis of this new price.

Stock Deliveries of Heater Repair Parts

Market Quiet as Railways Fail to Cover Replacement Needs—Producers See No Lower Prices

Manufacturers of electric heaters report that they are in excellent shape to fill orders for repair parts. Reserve supplies of resistance wire, porcelain and the various metal parts are maintained at such a level that orders can be filled from stock. This condition is partly due to better shipments obtaining from manufacturers of wire, porcelain, steel, etc., and partly to a slack buying market.

Electric railways have not been covering their needs for repair heater parts. The winter to date, on the whole, has been far from severe, and this may be partly responsible, but probably even more potent reasons, it is stated, are lack of money and hopes for lower prices. At any rate the repair part buying has been far below the standard of other seasons. The market for complete heaters is very quiet too, as almost no orders have been placed recently.

Regarding prices, manufacturers discount any possibility of lower levels coming about for some time. Additional costs during the war, it is stated, were to a large extent absorbed by producers, and since that time the item of labor remains unchanged in this field. Porcelain is high and the drops in steel and in wire have not been enough to make much difference.

Good Buying of Lubricating Material

Some Producers Reduce the Price 10 per Cent Following the Drop in Crude Oil

Demand for lubricating oils and greases used by electric traction companies is naturally slightly less than during the summer peak period, but the total volume of sales, it is stated, remains entirely favorable. Inasmuch as street cars cannot well be operated without proper lubrication, producers are not as much affected by adverse business conditions as manufacturers of supplies in other lines. Those companies which supply electric railways with lubrication on a contract mileage basis report no difficulty in renewing contracts, while other concerns that supply oil chiefly on a gallonage basis state that sales are quite normal and up to expectations. Buying of track grease, too, has been up to the standard of the past. In fact, some companies claim that a campaign of education setting forth the advantages of using track grease has been producing results in the way of increased sales. Other companies, however, fail to notice any undue increase in this end of the business.

The supply of oil and grease is good at present. Traction companies are not in the habit of maintaining a very large supply at one time, but this practice is unnecessary inasmuch as sizable reserve stocks are maintained by producers at distribution points for immediate shipment. Competition in this line is now of the very keenest, and strenuous efforts toward rendering service and maintaining the quality of product are put forth by the various oil companies in order to secure and hold patronage.

Prices, following recent reductions in crude oil, have been reduced in commensurate amounts by several companies, the reduction amounting to about 10 per cent. Not all producers have taken this action, however. The further price tendency is dependent upon the trend that crude oil happens to take.

Rolling Stock

Northern Texas Traction Company, Fort Worth, Tex., through G. H. Clifford, vice-president and general manager, announces that the company is planning extensive improvements with a view to bettering the service. Four large modern cars will be ordered at once and other cars now in service will be overhauled. An increase in interurban fare is proposed.

Track and Roadway

Phoenix (Ariz.) Railway.—The Traction Commission has ordered City Engineer L. B. Hitchcock to make a complete survey of conditions along rights-of-way of the Phoenix Railway and to make a report shortly. The report will be based on necessary work to put the different thoroughfares in condition for travel. The thoroughfares will include intersections, portions of Monroe Street and Washington Street to Ninth Avenue.

Monroe (La.) Street Railway.—The Monroe City Commission has been petitioned by Pine Street property owners who ask for paving work on Pine Street from River Street to Seventh Street and for a removal of the tracks of the street railway.

Trenton & Mercer County Traction Corporation, Trenton, N. J.—The Trenton & Mercer County Traction Corporation has informed the Trenton City Commission that it will relay tracks and place new paving on Pennington Avenue, North Clinton Avenue, Mulberry Street and West State Street. The company will also install conduits on Lincoln Avenue to connect with the power house to take the place of wires.

Toronto, Ont.—One of the first matters to be considered by the new City Council will be a request from the local Transportation Commission that application be made to the Legislature [illegible] power to construct new car lines as local improvements.

Frankford Elevated Railway, Philadelphia, Pa.—The Department of City Transit, Philadelphia, will accept proposals for car motors, plumbing, heating and lighting for the work appurtenant to the Frankford Elevated Railway until Feb. 8.

Quebec (Que.) Street Railway.—A resolution was passed by the Quebec Board of Trade urging the Quebec Railway to establish a trolley line between the city and the Quebec bridge.

Knoxville Railway & Light Company, Knoxville, Tenn.—Citizens living along Morelia Avenue, Oakwood, have started a movement to petition the City Commission and the Knoxville Railway & Light Company to have the track removed from the south side to the middle of the avenue. Residents, it is said, will pay for paving expenses if the track should be changed.

Central Texas Interurban Railway, Bryan, Tex.—The County Commissioners' Court at Bryan, Tex., halted the removal of the tracks of the Central Texas Interurban line running from Bryan to College Station, which was sold several months ago under foreclosure proceedings to Sam Wexler. Wexler had just begun taking up the rails when an injunction was granted. The County Commissioners claimed that taxes due the county on the line amounting to $5,117 remain unpaid.

Greenville, Tex.—The City Council of Greenville, Tex., acting under the authority recently given them by referendum when the voters of Greenville voted to retain and operate the street railway system as a municipally owned utility, has outlined a plan for extensive repairs and betterments in the street car lines. Two belt lines, one to loop the southwestern and the other the southeastern parts of the city, are proposed, and a line to Wesley College and to the suburb of Peniel will also be built. A citizens' committee to co-operate with the City Council in working out plans for improving and operating the street car system has been appointed. The street cars had not been operated for three years prior to their sale to the city late last year.

Trade Notes

The Wellman-Seaver-Morgan Company, Cleveland, Ohio, announces that its Atlanta district office has been transferred to Birmingham, Ala., room 302, American Trust Building. Quin W. Stuart continues as district manager.

The U. T. Hungerford Brass & Copper Company, New York City, announces that it has established a monel-metal department in charge of John J. Dillon, who for eight years has made a specialty of this metal and its products.

The Electric Power Equipment Corporation, which was formerly the Lewis & Roth Corporation, has its office and factory at Thirteenth and Wood Streets, Philadelphia, and its officers are L. R. Lewis, president; J. H. Gledhill, vice-president; N. S. Moore, secretary, and F. W. Dinsmore, treasurer.

W. H. Corddry, of the Harrisburg office of Gannett, Seelye & Fleming, Inc., consulting engineers, has been placed in charge of the Memphis office of the firm, which covers engineering design, construction, reports and valuation for public utilities.

The James Leffel & Company has recently completed and occupied an entirely new factory and offices in Springfield, Ohio. The main factory is 75 ft. wide by 800 ft. long, from which extend the boiler shop, power plant, foundry, pattern shop, pattern storage, warehouse and garage.

Linke-Hoffmann Werke Aktiengesellschaft.—In the issue of this paper for Dec. 4, 1920, page 1153, an illustrated account was given of two recent types of center-entrance cars used in Germany. These cars were built by the Linke-Hofmann Werke Aktiengesellschaft, which three years ago took over the works of the Waggonfabrik P. Herbrand & Company. The works are located at Cologne-Ehrenfeld.

Griffin Car Wheel Company, Council Bluffs, Iowa, is pushing work on its new million dollar plant. Structural steel for the fourth building is being placed and new machinery installed. Two large cranes have been erected and nearly all the hydraulic machinery is on the ground. The annealing pits, of which there are seventy-two, are being installed. The plant will cover, it is reported, over 70 acres.

American Brake Shoe Elects Officers.—At a meeting of the board of directors of the American Brake Shoe & Foundry Company, 30 Church Street, New York City, held on Jan. 11, William B. Given, Jr., and W. F. Cutler were elected vice-presidents of the company. Mr. Given was formerly assistant vice-president and Mr. Cutler was and still retains the office of president of the Southern Wheel Company.

The Northern Engineering Works, Detroit, Mich., have established a new office at 990 Union Arcade Building, Pittsburgh, in charge of J. B. Laird, who has heretofore represented the company in western New York and northern Pennsylvania. Mr. Laird will cover the entire East and Ohio Valley and for the present will also look after the Buffalo district. The company manufactures cranes and hoists.

The Black & Decker Company, Baltimore, Md., announces that in spite of general conditions in 1920 it was the most successful year in the company's history, net sales being nearly 40 per cent greater than the highest previous year, 1919. Dividends of about 7 per cent were paid on the common stock of the company, the last one being on Dec. 31, 1920. The board of directors has been augmented from five to seven by the election of Charles C. Homer, Jr., and William G. Baker, Jr., both of Baltimore.

The Canadian Cleveland Fare Box Company, Ltd., Preston, Ont., has been formed. It is a development of the organization which formerly operated under the name M. C. McElligott, who now becomes president of the new company, with L. L. McElligott as vice-president and secretary. The change has been necessitated by the rapid expansion of the business, which, Mr. McElligott advises, has caused an increase in space of 400 per cent and in the staff of 100 per cent within the last four months.

The Chicago Pneumatic Tool Company, 6 East Forty-fourth Street, New York City, announces the appointment of J. F. Huvane as Eastern manager of compressor and engine sales, with headquarters at 6 East Forty-fourth Street, New York City, and G. C. Van den Boom as Western manager of compressor and engine sales, with headquarters at 300 North Michigan Boulevard, Chicago. The company also announces the resignation of H. L. Dean, formerly manager of the compressor and engine sales.

The National Foreign Trade Council will hold its eighth annual convention at Cleveland, Ohio, on May 4, 5, 6 and 7. The organization, which is devoted to promoting foreign trade extension throughout the world and which contains in its membership about 75 representatives of leading business interests, has appointed a committee of fifty representative Clevelanders to take charge of the preliminary arrangements for the convention. Headquarters of the committee is at 409 Park Building, Cleveland.

The Engineering Business Exchange, 30 Church Street, New York City, engaged in the purchase and sale of engineering and technical business properties, announces the opening of a Pacific coast branch in charge of James T. Whittlesey with offices in the Claus Spreckels Bldg., San Francisco. Mr. Whittlesey, who is a Yale graduate, for twelve years was chief engineer of the Public Service Electric Company of New Jersey and since his removal to California eight years ago, has been engaged in a general engineering consulting practise.

New Advertising Literature

Rubber Gloves.—The Seamless Rubber Company, Inc., New Haven, Conn., distributing a leaflet describing its "Maderite" brand of electric linemen's gloves, etc.

Lubrication.—"Lubrication of Hydraulic Turbines" is the subject of the leading article appearing in the December, 1920, issue of *Lubrication*, a monthly publication which is issued by the Texas Company, 17 Battery Place, New York City.

Industrial Haulage.—The General Electric Company, Schenectady, N. Y., has issued an illustrated bulletin, No. 44,251, describing its different types of electric locomotives for industrial haulage.

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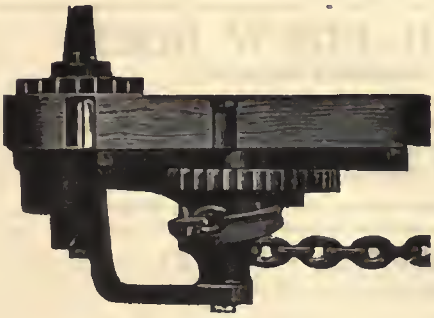

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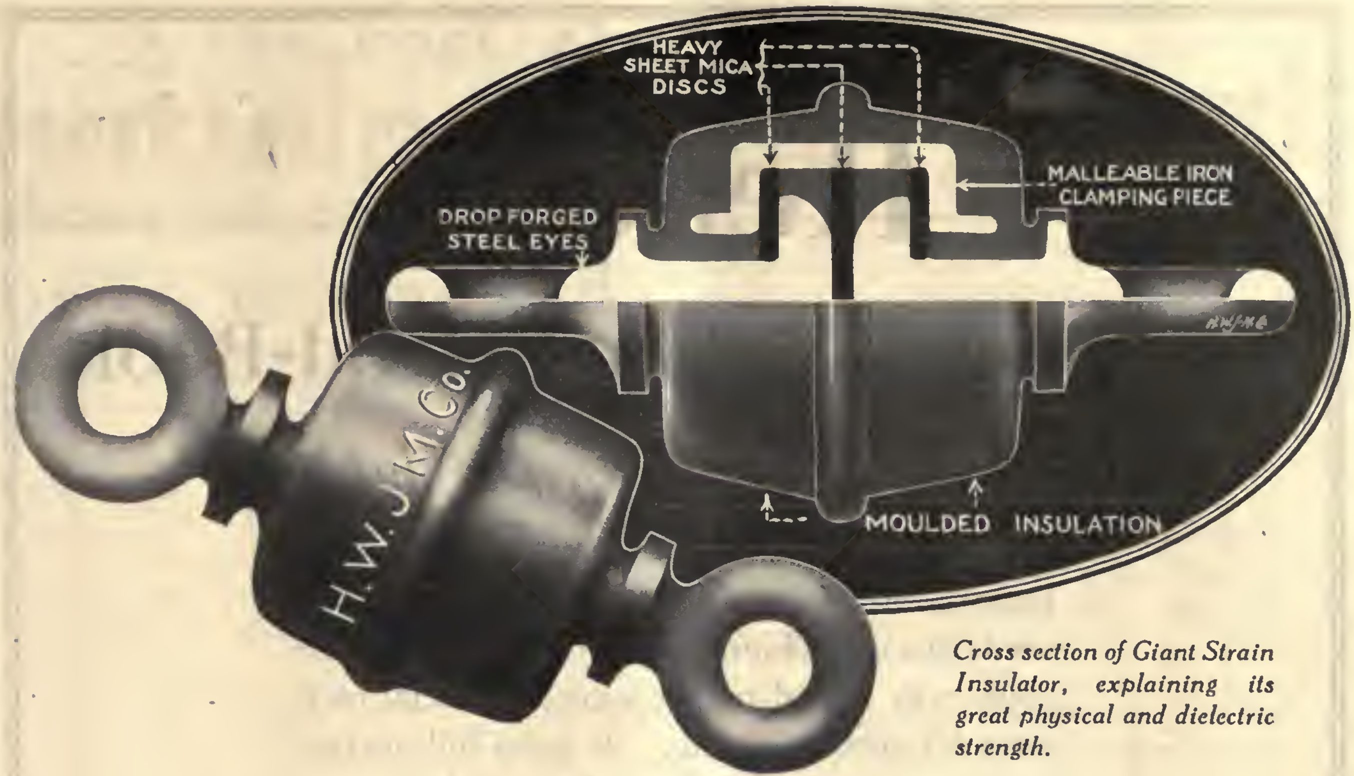
(Established 1905)

Irvington, New Jersey



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OUT in all kinds of weather, often subjected to blows from trolley poles or acting as targets for small boys—if there's any job that takes physical and electrical strength, it's the work a strain insulator has to do.

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A lubricant that decreases labor charges—that reduces wear on axles and armatures—that saves brasses and babbitts — that eliminates hot boxes and cut axles — a lubricant that accomplishes these things is the truly *economical* lubricant and the lubricant for you to use. Tulc is that kind of a lubricant. Tulc sales are not made because of low first cost alone, but because of results.

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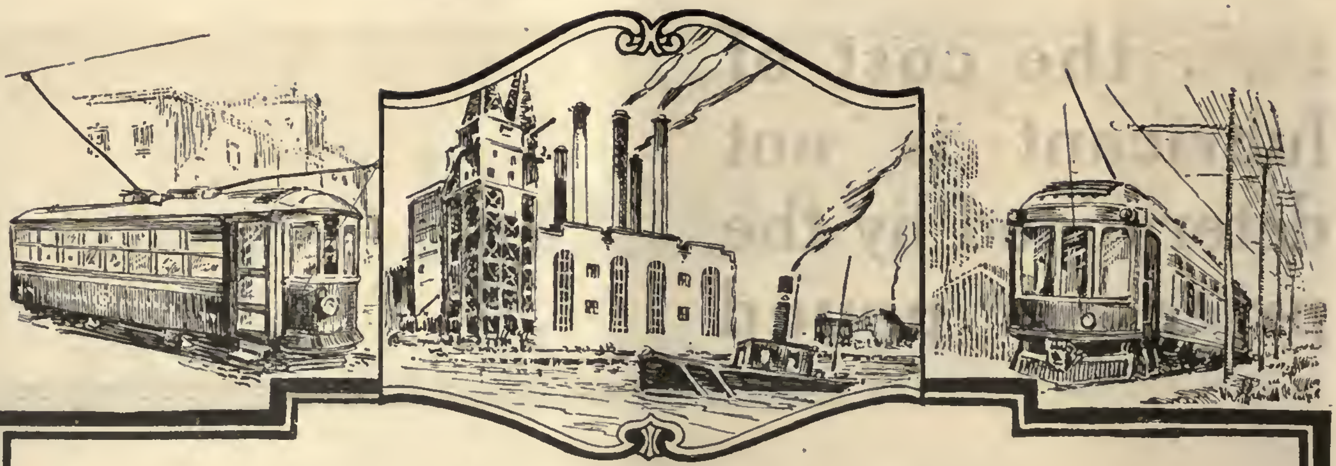

Crude Resources

It is generally known that there are certain differences between crude oils coming from different oil fields.

For the most part, these differences do not affect the kind or quality of lubricating oils which can be manufactured from the crude, but there are some slight differences which must be taken into account for certain classes of work.

On this account The Texas Company is exceptionally fortunate in that their producing fields are so widespread. We secure our crudes from a number of oil fields distributed in various States, and thus, when we manufacture a Texaco Lubricant for a special purpose, we can select the crude best adapted from the variety at our disposal, for securing the particular lubricating results desired. Our large production and our extensive storage enables us to keep on supplying the right oil for the right place, at all times.

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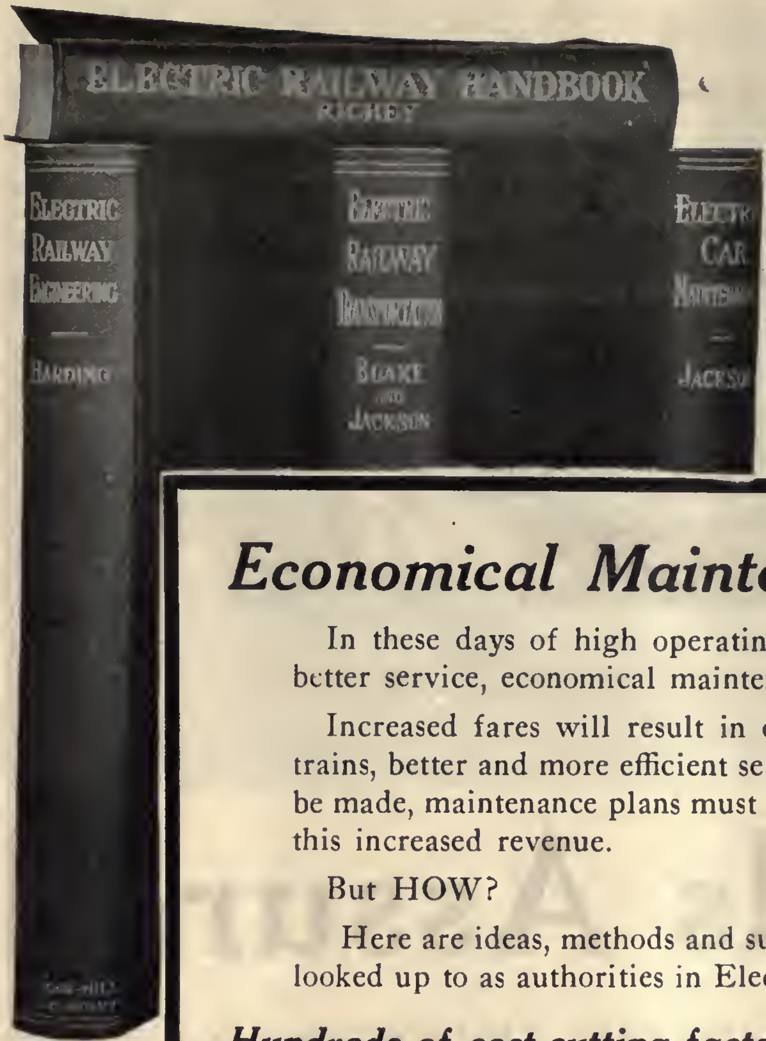
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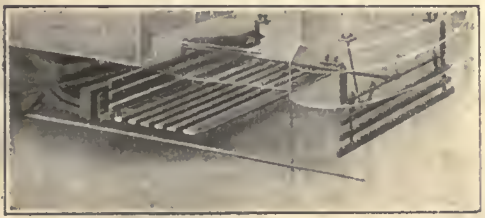
If you would know what all of the large railways specify when they are in the market for front-end protection for either heavy cars or safety cars, watch the details of equipment for fenders and wheel-guards and you will invariably see "H-B" Life Guards."

From Canada to the Gulf, H-B Life Guards are in service; In New York, Chicago, Baltimore, Brooklyn, Philadelphia, San Antonio, Montreal, and many other cities and towns all over the country.

Why?

Because for years these railway executives have used H-B Life Guards and they have not been found wanting. Their action is positive and quick as a flash. They require little attention and work automatically. Specify them today and keep the death claims away.

"Barrier of Safety" between the fallen pedestrian and the car wheels



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Results

Every Electric Railway Manager in America today is anxious to increase his results in 1921.

What is the underlying basis of results in the electric railway field?

Co-operation on the part of the human element. Horsepower without man-power is worth little. And man-power depends on mental attitude. A worker produces only as much as *he thinks* he ought to produce.

Absenteeism, Overtime, Waste, Labor Turnover, and Underproduction, which are causing enormous loss on railways, are caused mainly by wrong mental attitude on the part of the workers. They have been educated to the wrong viewpoint. The only sound remedy is to educate them to the right viewpoint.

Any operating head can greatly improve his results by means of our Service, to teach the workers the true facts of proper relationship.

You have only to make a test of our constructive work to satisfy yourself thoroughly of its highly profitable character. Sherman Service is not an experiment, but has stood the acid test in more than fifty different kinds of industry throughout the U. S. and Canada. Our clients include large concerns in practically every industrial field.

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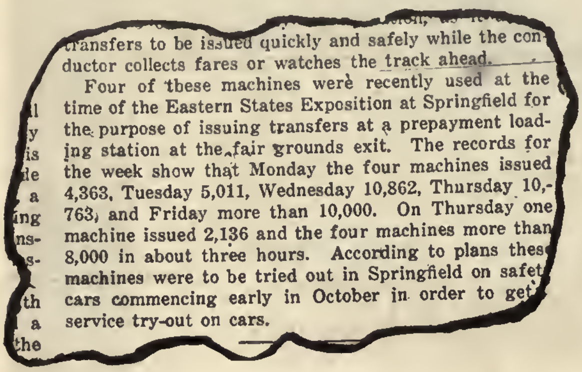
Shanklin Transfer Issuing Machines *Have Made Good*



ransfers to be issued quickly and safely while the conductor collects fares or watches the track ahead.

Four of these machines were recently used at the time of the Eastern States Exposition at Springfield for the purpose of issuing transfers at a prepayment loading station at the fair grounds exit. The records for the week show that Monday the four machines issued 4,363, Tuesday 5,011, Wednesday 10,862, Thursday 10,763, and Friday more than 10,000. On Thursday one machine issued 2,136 and the four machines more than 8,000 in about three hours. According to plans these machines were to be tried out in Springfield on safety cars commencing early in October in order to get service try-out on cars.

Daily Report of Transfers Issued at Eastern States Fair, September, 1920

September 20, 1920	4,363
September 21, 1920	5,011
September 22, 1920	10,862
September 23, 1920	10,763
September 24, 1920	19,719
September 25, 1920	16,819

Four machines issued these transfers for the week, showing that machines are built for hard usage.

—Solves Your Problem on Safety and on P-A-Y-E Cars

These machines tested during the Eastern States Exposition by Springfield Street Railway Company, issued more than 10,000 transfers a day when the traffic demanded it and could easily have issued more, had more transfers been required.

Transfer Machines have been in operation since October 10, 1920, in Springfield, Mass., on both the large prepayment cars of the Walnut Street Line and on the safeties of the Maple Street Line, issuing all transfers and giving unequaled service.

The cost of transfers has been reduced and the saving over daily dated transfers is more than 40 per cent. The expense of handling and checking transfers also is less. The last transfer issued each day constitutes the conductor's record. These Machines weigh 21 pounds, and can be changed quickly from one end of the car to the other.

Platform operations are speeded up, resulting in faster schedules, and the saving of seconds per trip amounts to hours saved during a day's work.

The cost of loading passengers is reduced to a minimum because the Shanklin System increases the efficiency of the conductor or operator.

With this machine installed, the conductor or operator has both hands free for the operation of cars or for the collection of fares. Hence accidents are fewer.

The passenger pays the fare and secures a transfer without delay, thus saving the conductor's time at destinations. Shanklin Rapid Transfer Machines are specially designed for any type of car operation.

Transfers can be issued at the rate of 60 to 70 per minute, if necessary, without interfering with the duties of the operator on safety cars. This is a valuable asset.

If you are contemplating zone fares, our Zone Ticket Machine will interest you.

Submit your transfers or zone problems to our engineers and let them solve your difficulties.

Shanklin Equipment Company, Inc.

Besse System Building, Springfield, Mass.
11 and 12

Links that Save Time and Temper

It requires considerable time and patience to bend a *straight* link at just the correct place to properly fit into a Renewable Fuse. Usually one end is bent just too much or too little to expose the figures under the windows in the cap, and to make proper contact at the other end.

To eliminate this difficulty, "Union" Renewable Fuses come with one end bent to the proper length. Simply drop the link into the casing, slip on the washers, tighten caps with the fingers, and the fuse is ready for service. Time? Less than it takes to tell it.

This is only one of a number of exclusive features which make "Union" the easiest and quickest fuse to renew.

"Union" Fuses, both Renewable and Non-renewable, are for sale by leading electrical jobbers and dealers.

Free descriptive booklet sent on request.

In order to clear up any possible misunderstanding on the part of the public, we wish to announce that our "Union" Enclosed Fuses, both renewable and non-renewable, are fully approved by the Underwriters' Laboratories, Inc., in all capacities of N. E. C. standard dimensions for both 250 and 600-volt service.

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But they do reduce, to the vanishing point, the possibility of such tragedies as the foregoing:

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Second, because inspection of Boyerized pins and bushings readily reveals when they have reached the retiring point, whereas there is often no telling when a comparatively new but non-treated piece of equipment will betray you in an emergency.

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Bemis Car Truck Company

Electric Railway Supplies

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Shesh

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Vishnu the Hindu god once turned himself into a gigantic tortoise. On his back he placed the mountain Mandara. Then he ordered his pet serpent Shesh to coil itself about the mountain. When he objected, Vishnu called two demons who started to tie Shesh into a love-knot when the old serpent got his Dutch up and begain threshing about so furiously that he churned the ocean into foam.

No Operator would swallow that story. But let some vendor of cheap carbon brushes come along and a *few* Operators will jeopardize a thousand-dollar machine for the sake of saving a few cents on brushes!

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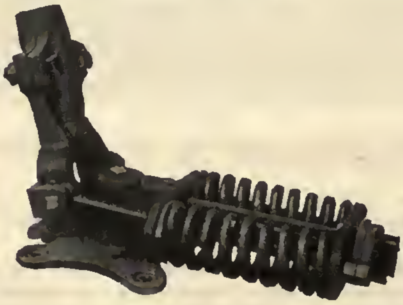

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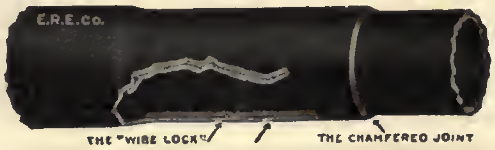

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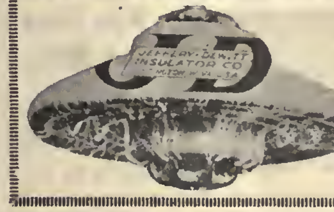


Better High Tension Insulators
Advice, Estimates and Engineering Service on request
Jeffery-Dewitt Insulator Co.
Huntington, West Virginia

COPPER CLAD STEEL COMPANY
OFFICE AND WORKS: RANKIN, PA. BRADDOCK P. O.
WESTERN SALES REPRESENTATIVES: STEEL SALES CORPORATION, CHICAGO, ILL.
NEW YORK SALES OFFICE: 30 CHURCH STREET, NEW YORK CITY
COPPERWELD Wire—a non-corroding electrical conductor
8% Lighter—50% Stronger than Copper

SPECIAL TRACK WORK

For Electric and Steam Railroads, in all types of construction
Converter and Electric Steel Castings
Hammer and Press Forgings
Seamless Steel Gas Cylinders

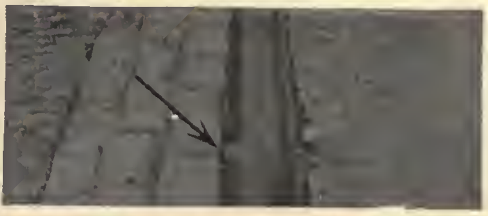
WM. WHARTON JR. & CO. INCORP.

EASTON, PA.

Subsidiary of Taylor-Wharton Iron & Steel Co.
High Bridge, N. J.

OTHER PLANTS:
Philadelphia Roll & Machine Co., Philadelphia.
Tioga Steel & Iron Co., Philadelphia.

ORIGINATORS OF MANGANESE STEEL TRACK WORK



Completed Thermit Insert Weld Installed in the Street

Thermit Insert Welds Eliminate Rail Joints

WHILE there are many so-called systems of welding, the fact remains that the *Thermit Insert Process is the only practical one which absolutely eliminates the joint.* The other systems only partially solve the problem, as in most cases they simply weld fish plates or splice bars to the rails. These systems have many objections, the principal one being that the heads of the rails are not continuous and the elastic curve in the top fibres of the head cannot be transferred across the gap between the rail ends, with the result that the joint eventually cups.

Send for Pamphlet 3932

Metal & Thermit Corporation

Pittsburgh
Chicago

120 Broadway, New York
Boston

Toronto
San Francisco

Dependable Track Work for Electric Railways

Frogs, Switches, Switch Stands, Crossings, Special Track Work, Machine and Drop Forgings, Pressed Steel and Hammer Work. Foundry for Manganese Steel Castings and special facilities for heat treating. Let us bid on your requirements.

ST. LOUIS FROG & SWITCH CO.
ST. LOUIS, MO.

HIGH-GRADE TRACK WORK

SWITCHES—MATES—FROGS—CROSSINGS
COMPLETE LAYOUTS
IMPROVED ANTI-KICK BIG-HEEL SWITCHES
HARD CENTER AND MANGANESE CONSTRUCTION

New York Switch & Crossing Co.
Hoboken, N. J.

STANDARD PRODUCTS

Copper, Brass, Bronze Wire, Rods,
Copper and Brass Tubes
Colonial Copper Clad Steel Wire
Magnet and Weatherproof Wire
Rubber Insulated Wire
Lead Covered and Armored Cables
Cable Terminals, Junction Boxes

Standard Underground Cable Co.

Boston, New York, Philadelphia, Pittsburgh, Chicago, Detroit, St. Louis, San Francisco.

BARBOUR-STOCKWELL CO.
205 Broadway, Cambridgeport, Mass.
Established 1858

Manufacturers of
Special Work for Street Railways
Frogs, Crossings, Switches and Mates
Turnouts and Cross Connections
Kerwin Portable Crossovers
Balkwill Articulated Cast Manganese Crossings

ESTIMATES PROMPTLY FURNISHED

"ACME" (NESTABLE)
Anti-Corrosive Corrugated
Galvanized CULVERTS

---plus Concrete

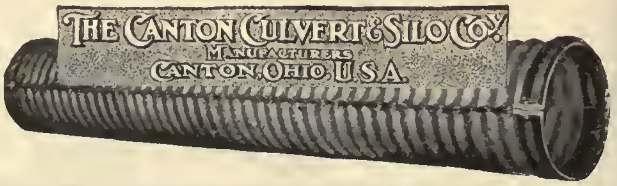
It is an established fact that "ACMES" have wonderful lasting qualities—they last for years and years. It is also known that concrete, when properly mixed and laid, is as permanent a material as can be found.

That is why a combination of the two make the most durable culvert construction that we know of. Here's what the War Dept. thinks of "ACMES"—plus concrete:

> "The 1200 ft. of 60 inch 'ACME' Culverts furnished for Camp Sherman, Ohio, are very satisfactory and the job when completed looked very good. This culvert was encased in concrete and it is possible that, constructed in this manner, it will last for over a hundred years."

It is not necessary, of course, to regularly encase "ACMES" in concrete—it is just a means of securing longer service from them.

Write for delivered prices


THE CANTON CULVERT & SILO CO.
MANUFACTURERS
CANTON, OHIO, U.S.A.

BAKELITE-DILECTO
The fields of usefulness for Bakelite-Dilecto are many and varied because of its superior merit over materials heretofore available in sheets, tubes or rods. The exceptional qualities of Bakelite-Dilecto are satisfying electric railways all over the country. Investigate.

The Continental Fibre Co., Newark, Delaware
Branch Offices:
CHICAGO, 332 S. Michigan Ave. NEW YORK, 233 Broadway
Pittsburgh Office, 301 Fifth Ave. San Francisco Office, 525 Market St.
Los Angeles Office, 411 S. Main St.
Canadian Office, 1710 Royal Bank Bldg.,
Cor. King and Yonge Sts.
Toronto, Ont.,

A Single Segment or a Complete Commutator

is turned out with equal care in our shops. The orders we fill differ only in magnitude; small orders command our utmost care and skill just as do large orders. CAMERON quality applies to every coil or segment that we can make, as well as to every commutator we build. That's why so many electric railway men rely absolutely on our name.

Cameron Electrical Mfg. Co., Ansonia, Connecticut

CONDENSERS, SPRAY NOZZLES,
VALVES, OIL BURNING EQUIPMENT,
FEED WATER HEATERS, INJECTORS,
Distillers, Oil Coolers, Chemical Equipment

Schutte & Koerting 1155 Thompson Street
Philadelphia, Pa.

SPECIALISTS
in the
Design and Manufacture
of
Standard—Insulated—and Compromise Rail Joints

The Rail Joint Company
61 Broadway, New York City

ERICO RAIL BONDS

Means lasting improvement of track return, thus more uniform line voltage and less motor trouble.

ARC WELDING EQUIPMENT

Means increased repair facilities, thus longer life of equipment and lower maintenance cost.

Electric Railway Improvement Co.
CLEVELAND, O.

J.H. WILLIAMS & CO.
"THE WRENCH PEOPLE"
Brooklyn · Buffalo · Chicago

GRANITE PAVING BLOCK

Northern Granite and Stone Co.
909 Leader-News Bldg.
Cleveland, O.

Aladdin's Lamp
has nothing on the
"Searchlight"

When an advertiser sells equipment for over $4,000.00 through "Searchlight" advertising that cost $12.00, we think "Searchlight" is at least entitled to "favorable mention."

615

Searchlight Section
Employment — Equipment — Business Opportunities

FOSTER SUPERHEATERS

A necessity for turbine protection, engine cylinder economy and utilization of superheat for all its benefits

Power Specialty Company Boston Chicago Philadelphia San Francisco Pittsburgh London, Eng. **111 Broadway, New York**

IN 1898

STEAM SUPERHEATERS

Were introduced commercially in the United States by this Company. Owners of boilers it has built—Babcock & Wilcox, Stirling and Rust—not now equipped with these coal-saving accessories can obtain information about superheating possibilities from the nearest office listed below.

THE BABCOCK & WILCOX COMPANY
85 LIBERTY STREET, NEW YORK

BOSTON, 49 Federal Street
PHILADELPHIA, North American Bldg.
PITTSBURGH, Farmers Deposit Bank Bldg.
CLEVELAND, Guardian Bldg.
CHICAGO, Marquette Building
CINCINNATI, Traction Bldg.
ATLANTA, Candler Bldg.
TUCSON, ARIZ., 21 So. Stone Avenue
NEW ORLEANS, 533 Baronne Street
DENVER, 435 Seventeenth Street
SALT LAKE CITY, 705-6 Kearns Bldg.
HONOLULU, H. I., Castle & Cooke Bldg.
SAN FRANCISCO, Sheldon Bldg.
LOS ANGELES, 404-406 Central Bldg.
SEATTLE, L. C. Smith Bldg.
HAVANA, CUBA, Calle de Aguiar 104
HOUSTON, TEXAS, Southern Pacific Bldg.
SAN JUAN, PORTO RICO, Royal Bank Bldg

WE CAN CUT YOUR COST OF HEATING CURRENT

Write for THERMOSTATIC CONTROL INFORMATION

GOLD

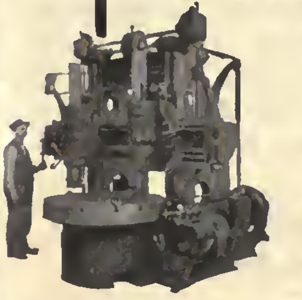
ELECTRIC HEATERS Cut Installation and Maintenance Charge.
VENTILATORS Also Ventilate in Stormy Weather.
THERMOSTATS Save Current.
ORIGINATED the use of NON-CORROSIVE Wire for Electric Car Heaters.
ORIGINATED The Ventilated Coil Support.

LET US FIGURE ON YOUR NEXT REQUIREMENTS

Gold Car Heating & Lighting Co., 17 Battery Pl., New York

NILES-BEMENT-POND CO.

111 BROADWAY, NEW YORK



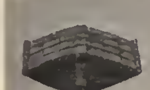
MACHINE TOOLS

FOR ELECTRIC RAILWAYS

Axle Lathes
Wheel Presses
Car Wheel Lathes
Boring Mills
Lathes
Hammers
Cranes
General Machine Tools

FORT PITT SPRING AND MANUFACTURING CO.

PITTSBURGH, PA.
Manufacturers of



COIL AND ELLIPTIC

SPRINGS

FOR

RAILWAY SERVICE

FORD TRIBLOC

A Chain Hoist that excels in every feature. It has Planetary Gears, Steel Parts, 3½ to 1 factor of Safety. It's the only Block that carries a five-year guarantee.

FORD CHAIN BLOCK CO.
Second and Diamond Sts., Philadelphia

WE-FU-GO AND SCAIFE

WATER

PURIFICATION SYSTEMS
SOFTENING & FILTRATION
FOR BOILER FEED AND
ALL INDUSTRIAL USES

WM. B. SCAIFE & SONS CO. PITTSBURGH, PA.

SPECIFY

THE TERRY TURBINE

For Driving Your Auxiliaries

TERRY STEAM TURBINE CO.
Hartford, Conn

Use them in your terminals—

PEREY TURNSTILES or PASSIMETERS

Faster than the ticket seller

Perey Manufacturing Co., Inc.
30 Church Street, New York City

BUCKEYE JACKS

high-grade R. R. Track and Car Jacks.

The Buckeye Jack Mfg. Co.
Alliance, Ohio

Compare Them

The faint light of a candle and the strong rays of a searchlight. They represent the comparative efficiency of other ways of finding what you want and advertising for it in the

613

SEARCHLIGHT SECTION

Employment Equipment Business Opportunities

WHITING CORPORATION

(formerly Whiting Foundry Equipment Co.)

General Offices and Works: Harvey, Ill.

CRANES OF ALL TYPES
FOUNDRIES EQUIPPED COMPLETE

INTERNATIONAL FARE REGISTER

Type R-10
Single Register

International Fare Registers. Single registers, round and square; double registers, duplex counters, car fittings, foot-operating devices for single and double registers. Exclusive selling agents for Heeren enamel cap and coat badges.

The International Register Co.
15 South Throop Street, Chicago

Waterproofed Trolley Cord

Is the finest cord that science and skill can produce. Its wearing qualities are unsurpassed.

FOR POSITIVE SATISFACTION ORDER SILVER LAKE

If you are not familiar with the quality you will be surprised at its **ENDURANCE and ECONOMY**

Sold by Net Weights and Full Lengths

SILVER LAKE COMPANY
Manufacturers of bell, signal and other cords.
Newtonville, Massachusetts

MORE-JONES "TIGER-BRONZE" AXLE AND ARMATURE BEARINGS

Not always the cheapest, but ever lowest in ultimate cost

MORE-JONES BRASS & METAL CO.
St. Louis, Missouri.

DREW MOTORMEN'S SAFETY MIRRORS

Eliminate Accidents

Send for Catalogue No. 18

DREW ELECTRIC & MFG. CO.
Collamer Ave. and Nickel Plate Railroad, Cleveland, O.

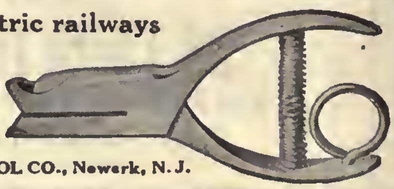
SAMSON SPOT WATERPROOFED TROLLEY CORD

Trade Mark Reg. U. S. Pat. Off.
Made of extra quality stock firmly braided and smoothly finished.
Carefully inspected and guaranteed free from flaws.
Samples and information gladly sent.

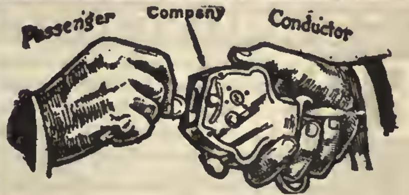
SAMSON CORDAGE WORKS, BOSTON, MASS.

75% of the electric railways use

B-V Punches



Send for Catalog.
BONNEY-VEHSLAGE TOOL CO., Newark, N. J.



Direct Automatic Registration By the Passenger

Rooke Automatic Register Co.
Providence, R. I.

162 RAILROADS USE DIXIE CUP Penny Vending Machines
To Solve their Drinking Cup Problems in Cars and Stations
INDIVIDUAL DRINKING CUP COMPANY, INC.
HUGH MOORE, President
Original Makers of the Paper Cup — 220-230 W. 19th Street New York

Heating and Ventilating

Let us demonstrate to you how we can heat and ventilate your cars at the lowest possible cost

The Cooper Heater Company
Carlisle, Pa.

The CLEVELAND is the practical Fare Box for the One-Man Car.
Let us tell you why.

The Cleveland Fare Box Company
Cleveland, Ohio
Canadian Branch, Preston, Ontario.

Electric car heaters—thermostatic control—pneumatic car door operators—buzzers, single-stroke bells, starting signal lights—special resistances.

CONSOLIDATED CAR HEATING CO.
ALBANY, NEW YORK, CHICAGO

ELECTRIC RAILWAY JOURNAL

Think "SEARCHLIGHT" First

ADVERTISING RATES

POSITIONS VACANT—Business Opportunities and other undisplayed ads, 8 cents a word, minimum $2.00 an insertion.

POSITIONS WANTED—Evening work wanted, tutoring and other undisplayed ads of individuals looking for employment, 4 cents a word, minimum 75 cents, payable in advance.

ADD 5 WORDS for box number in undisplayed ads if replies are to any of our offices. There is no extra charge for forwarding replies.

DISCOUNT OF 10% if one payment is made in advance for 4 consecutive insertions of undisplayed ad.

ADS IN DISPLAY TYPE—Space is sold by the inch (30 in. to a page), the price depending upon total space used within a year, some space to be used each issue.

RATE PER INCH for ads in display space:

1 to 3 in.,	$4.50 an in.	15 to 29 in.,	$3.90 an in.
4 to 7 in.,	$4.30 an in.	30 to 49 in.,	$3.80 an in.
8 to 14 in.,	$4.10 an in.	50 to 99 in.,	$3.70 an in.

POSITIONS VACANT

EMPLOYMENT

POSITIONS WANTED

POSITIONS VACANT

ENGINEER wanted, track supervisor. Man qualified to look after maintenance and upkeep of about one hundred miles of surface track and overhead lines. Must be familiar with preparation of estimates, supervision of actual work and cost accounting. State salary expected. P-830, Elec. Ry. Journal, Real Estate Trust Bldg., Philadelphia, Pa.

MASTER mechanic wanted for Middle West on a division operating 40 interurbans on 600-1,200 volts. P-787, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

SUPERINTENDENT for small, growing property. Excellent opening for bright, active, ambitious man, thoroughly familiar with street railway operation and construction. Address, stating age, experience and salary expected, F. D. Sullivan, General Manager, Iron River, Michigan.

TECHNICALLY trained man to take charge of and coordinate efforts in small drawing office of street railway corporation. Should have executive ability and some track and building experience. Chance for advancement. Must be Canadian citizen. State age experience and salary expected. P-829, Elec. Ry. Journal.

TRAIN dispatcher on electric line wanted: Second trick, hours 2 p.m. to 11 p.m. Salary $190 per month. System operates about 60 miles of street and interurban railway in a rapidly growing community. Apply to Gary Street Railway Co., 567 Broadway, Gary, Indiana.

POSITIONS WANTED

COMPETENT electric railway man wishes to make a change; 16 years' experience in transportation departments of properties operating city and suburban lines; age 35; best of references. PW-832, Elec. Ry. Journal, Real Estate Trust Bldg., Philadelphia.

EDITORIAL and news writer who is familiar with public relations problems confronting utility operators and who can, by his efforts, produce results that are tangible, is open for engagement. Present connection as editor and manager of a monthly public service magazine terminates March 1st. PW-827, Elec. Ry. Journal.

EXPERIENCED outside construction man desires position in way of electric railway, lighting, underground and submarine cables. Most experience in city of 200,000 population. Can produce results. PW-828, Elec. Ry. Journal, Real Estate Trust Bldg., Phila.

MANAGER, fully qualified from ground up, having passed through all departments and holding such positions as president and general manager. Now employed but desires better prospects, prefer property where there is hard work and produce results. PW-825, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

In Replying to "Blind" Ads

be careful to put on envelope the key number in the ad and also local address of office to which reply is sent.

10th Ave. at 36th St., New York.
935 Real Estate Trust Bldg., Phila.
533 Leader-News Bldg., Cleveland.
1570 Old Colony Bldg., Chicago.
531 Rialto Bldg., San Francisco.

Important

Original letters of recommendation or other papers of value should not be enclosed to unknown correspondents — send copies.

0195

POSITIONS WANTED

POSITION wanted by experienced armature winder, car wireman, general repair man, shop foreman and master mechanic would like to locate in Central States either as master mechanic shop foreman or department foreman. Can get results from men and equipment; first-class reference.. State your full proposition in first letter. PW-825, Elec. Ry. Journal, Real Estate Trust Bldg., Philadelphia.

SUPERINTENDENT of transportation or assistant superintendent desired by man 42 years of age, in good health; 20 years' experience in transportation on city lines, last six years as superintendent and claim agent. Can deal successfully with the public, handle trainmen and labor with good results; best reference as to character, ability, etc. PW-831, Elec. Ry. Joural, Old Colony Bldg., Chicago.

SUPERINTENDNT transportation desires change; clean, capable, progressive, possessing a full knowledge of all details of transportation; 18 years' experience dealing with public and labor; capable of taking over details of any city or suburban property and getting results. Will consider any property that requires extra effort and ability to get results; best of references. PW-833, Elec. Ry. Journal, Old Colony Bldg., Chicago.

AGENT AND SALESMAN

Ventilating Device

Traveling salesmen and local agents for ventilating device for steam and electric cars, buses; also for buildings of all kinds. Liberal commissions. V-W Ventilator Co., 315 Wesley Block, Columbus. Ohio.

TRANSFORMERS

FOR SALE

4—135 kva. General Electric Transformers, Type HS, Form RT, Cycles 60, Cap. 200 kw. 17100/19100/33000Y 370/370/185.

Excellent Shape—Practically New

2—135 kva. General Electric Transformers, Type HS, Form RT, Cycles 60, Cap. 200 kw. 2300/——17100/19100/33000Y.

Union Traction Company
Nashville, Tenn.

New—Used—Rebuilt

MACHINERY AND SUPPLIES
for construction and industrial work

READING ENGINEERING CO., INC.
154 Nassau St., New York

"Opportunity" Advertising:

Think
"*SEARCHLIGHT*"
First!

0099

COMPLETE POWER PLANT

FOR SALE

1—500 h.p. Westinghouse Compound Engine, Direct Connected to 550 volt Generator.

2—200 h.p. Harrisburg Engines, Belt Connected to Westinghouse Generators.

1—B & W Boiler, 2 Keeler Boilers, Water Heaters, Pumps, Piping, Switchboards and etc.

All in first class operating condition. Immediate delivery. Make us an offer.

The Lewistown & Reedsville Electric Railway Co., Lewistown, Pa.

EVERYTHING FOR TRACK
New and Relaying Rail
FITTINGS AND TOOLS
TRACK SPECIALTIES CO.
29 Broadway, New York City.

For 20 Years
we have been
Buying and Selling
Second-Hand Cars
Trucks and Motors
At Your Service
ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa.

WHEEL PRESS

84-in 300 ton Schafer Hydraulic Wheel Press; Belt Driven with three pumps; 12-in. Ram; First class condition. Price very reasonable.

ARTHUR S. PARTRIDGE
415 Pine Street, Saint Louis

FOR SALE

Two 300-H.P. 500 Volt MILL MOTORS

Two Westinghouse 300-h.p. 345 to 500 r.p.m., 500 volt, D.C., compound wound motors, with one spare armature, including two Cutler-Hammer, 300-h.p., 500 volt, D.C. Starters.

Condition good. Ready for inspection. Reason for selling, voltage changed. Write

H. LLEWELLYN, General Purchasing Agent
PITTSBURGH STEEL PRODUCTS CO.
Union Arcade Bldg., Pittsburgh, Pa.

NEW
REBUILT
ELECTRIC MOTORS
REWINDING
REPAIRING

NEW A.C. MOTORS ¼ to 15 H.P.—LARGE STOCK USED MOTORS
EXCELLENT REPAIR SERVICE ON ANY SIZE OR TYPE
CLEVELAND ARMATURE WORKS, INC.
EST. 1895 **4732-4-6 ST. CLAIR AVE., CLEVELAND O.** *INC. 1918*

Service Value

Scrap value for idle used machinery or surplus material is not enough. If it can be used by others they will pay *service value* for it. "Searchlight" will find these buyers for you.

Manufacturers who accept used machinery in part payment for new can dispose of it promptly by advertising in the Searchlight Section.

Machinery used in manufacturing and displaced by other equipment can be sold at a fair price by advertising it in the Searchlight Section.

Wide-awake dealers, agents or representatives can be secured through little Searchlight "Want" ads.

Manufacturing sites, partners, help, capital—anything that anybody in the machinery field is likely to have for sale or exchange for something else—can be located or disposed of through the Searchlight Section.

The cost of putting your Wants in this projector is very slight, whether for a man, for a job or for a market.

Searchlight Section

MACHINERY IN STOCK FOR IMMEDIATE SHIPMENT

STEAM TURBO GENERATING SETS

1—10,000 kw. (12,000 kva.) Westg. 3 ph., 00 cy., 13200 v., 1800 r.p.m. Turbo Unit with Le Blanc Jet Condenser.
1—1500 kva., 2200 v., 3 ph., 00 cy., 3600 r.p.m. Gen. Elec. Turbo Outfit with condensing equipment.
1—1500 kva. Gen. Elec. Curtis 25 cycle turbo unit, 3 ph., 1500 r.p.m., 370 volts, 175 lb. steam pressure.
1—400 kw. Westg., 3 ph., 00 cy., 2200 v., 3600 r.p.m. turbo unit.

FREQUENCY CHANGER SETS

1—1000 kw., 1250 kva., G. E., 2 ph., 62.5 cy., 5400/2700 v., 375 r.p.m. generator dir. rtd. to 1060 hp., 3 ph., 25 cy., 6600 v., 375 r.p.m. motor.
1—500 kw., G. E., 3 ph., 00 cy., 2300 v., 750 r.p.m. generator dir. ctd. to 700 hp., 3 ph., 25 cy., 13200 v., 750 r.p.m. motor.
1—500 kw., G.E., 3 ph., 60 cy., 4150 v., 300 r.p.m. generator dir. ctd. to 800 hp., 3 ph., 25 cy., 8000 v., 300 r.p.m. motor.

MOTOR GENERATOR SETS

1—1000 kw., Westg., 125/250 v., 204 r.p.m. generator dir. ctd. to 1400 hp., 3 ph., 60 cy., 6600/4000 v., 204 r.p.m. motor.
1—200 kw., G. E., 250 v., 900 r.p.m. generator dir. ctd. to 300 hp., 2 ph., 60 cy., 2400 v., 900 r.p.m. motor.
2—100 kw., Westg., 6 pole, 600 v., gen., each dir. ctd. to 150 hp., 3 ph., 25 cy. motor. These are self contained units on cast iron sub-bases.

ROTARY CONVERTERS

1—500 kw., Westg., rotary, 6 ph., 25 cy., 440 v., A.C., 600 v., D.C., 500 r.p.m.
1—500 kw., Gen. Elec., rotary, 600 volt, 60 cy., 1200 r.p.m.
2—300 kw., Westg., 3 ph., 60 cy., 270 v., A.C., 600 v., D.C., 600 r.p.m.
2—200 kw., G. E., 25 cy., 370 v., A.C., 600 v., D.C., 750 r.p.m.
1—150 kw., Westg., 3 ph., 60 cy., 370 v., A.C., 375 v., D.C., 720 r.p.m.
2—150 kw., Gen. Elec., 25 cy., 370 v., A.C., 600 v., D.C., 750 r.p.m.

TRANSFORMERS—25 CY.

6—500 kva., G. E., 13200 prim., 480 secy.
3—200 kva., Westg., 16500 v., prim., 460 secy.
3—200 kw., G. E., 6450 v., prim., 170 secy.
2—183 kva., G. E., 2300 v., prim., 430 secy.
3—150 kw., G. E., 6000 v., prim., 83 secy.
3—125 kw., Westg., 2200 v., prim., 220 secy.
2—75 kva., G. E., 13800 v., prim., 115/230 secy.
3—50 kva., G. E., 13800 v., prim., 115/230 secy.

TRANSFORMERS—60 CY.

1—7500 kva., Westg., 44600/32000-13500 vs.
3—2000 kva., G. E., 66000 v., prim., 6600-13200/22000 v., Y secy.
3—2000 kva., G. E., 66000-2200/4000 Y vs.
2—1250 kva., 2 ph., G. E., 36400/13200 prim., 2400/2200 v., secy.
4—750 kw., G. E., 44000/43000/42000 prim., 6600 secy.
6—600 kva., G. E., 23000/13200 volts.
3—400 kva., Allis-Chalmers, 6600-440 vs.
3—200 kva., G. E., 2200 prim., 370 secy.
3—160 kva., G. E., 6600-120/240 volts.
4—150 kw., Allis-Chalmers, 33000 v., prim., 2300 secy.
6—110 kw., G. E., 14500-13850 v., prim., 430-260-143 v., secy.
3—100 kw., G. E., 6200 v., prim., 2300 secy.
2—100 kw., G. E., 6000/5740 prim., 2760/2400 secy.
2—100 kw., G. E., 6600 v., prim., 603/504 secy.
2—100 kva., Westg., 11000-300 volts.
3—100 kw., Westg., 440 v., prim., 220 secy.
3—75 kva., G. E., 11000/9900-6600 vs.
3—75 kva., G. E., 2300 v., prim., 370 secy.
3—75 kva., Allis-Chal., 6600 v., prim., 440 secy.
3—55 kw., G. E., 2300/3070-370/330/185 vs.
3—50 kva., Westg., 6000/6300/6600 v., prim., 440/220 secy.
2—50 kw., Westg., 5000/6000 v., prim., 1000/1100/2000/2300 v., secy.

ARCHER & BALDWIN, Inc.

Telephone 4337-4338 Rector
114-118 Liberty Street, New York City

NEW—80-LB. RAIL and ACCESSORIES

Angle Bars, Spikes, Bolts and Nuts Complete

FOR SALE

A.R.A. "TYPE B" RAIL

Approximately 30,000 gross tons—standard lengths

Stored at Kearney, New Jersey

We buy electric and steam railways that are to be dismantled

HYMAN-MICHAELS COMPANY

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2115 Railway Exchange Bldg.

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Air Aftercoolers
Ingersoll-Rand Co.

Air Receivers
Ingersoll-Rand Co.

Anchors, Guy
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Angle Bars
Lackawanna Steel Co.

Automobiles and Buses
Brill Co., The J. G.

Axles
Bemis Car Truck Co.
St. Louis Car Co.

Axles, Car Wheel
Bemis Car Truck Co.
Brill Co., The J. G.
Standard Steel Works Co.
Westinghouse Elec. & Mfg. Co.

Axle Straighteners
Columbia M. W. & M. I. Co.

Babbitt Metal
More-Jones Brass & Metal Co.

Babbitting Devices
Columbia M. W. & M. I. Co.

Badges and Buttons
Electric Service Supplies Co.
International Register Co., The

Batteries Dry
Johns-Manville Co., H. W.

Batteries, Storage
Electric Storage Battery Co.

Bearings and Bearing Metals
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
General Electric Co.
More-Jones Brass & Metal Co.
St. Louis Car Co.
Westinghouse Elec. & Mfg. Co.

Bearings, Center and Roller Side
Stucki Co., A.

Bells and Gongs
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
St. Louis Car Co.

Benders, Rail
Niles-Bement-Pond Co.

Boilers
Babcock & Wilcox Co.

Boiler Tubes
National Tube Co.

Bond Testers
American Steel & Wire Co.
Rail Welding & Bonding Co.

Bonding Apparatus
American Steel & Wire Co.
Electric Ry. Improvement Co.
Electric Service Supplies Co.
Ohio Brass Co.
Rail Welding & Bonding Co.

Bonds, Rail
American Steel & Wire Co.
Copper Clad Steel Co.
Electric Ry. Improvement Co.
Electric Service Supplies Co.
General Electric Co.
Johns- Manville Co., H. W.
Ohio Brass Co.
Rail Welding & Bonding Co.
Westinghouse Elec. & Mfg. Co.

Book Publishers
McGraw-Hill Book Co., Inc.

Boring Tools, Car Wheel
Niles-Bement-Pond Co.

Boxes—Junction & Outlet
National Metal Molding Co.

Brackets and Cross Arms (See also Poles, Ties, Posts, Etc.)
Bates Expanded Steel Truss Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

Brake Adjusters
National Ry. Appliance Co.
Westinghouse Traction Brake Co.

Brake Shoes
Amer. Brake Shoe & Fdry. Co.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

Brakes, Brake Systems and Brake Parts
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
National Brake Co.
Safety Car Devices Co.
St. Louis Car Co.
Westinghouse Traction Brake Co.

Brooms, Track, Steel or Rattan
Zelnicker, W. A., Supply Co., Inc.

Brushes, Carbon
Corliss Carbon Co.
General Electric Co.
Jeandron, W. J.
Morganite Brush Co., Inc.
United States Graphite Co.
Westinghouse Elec. & Mfg. Co.

Brush Holders
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.

Bushings
National Metal Molding Co.

Bushings, Case Hardened and Manganese
Bemis Car Truck Co.
Brill Co., J. G., The

Bushings, Graphite and Wooden
Bound Brook Oilless Bearing Co.

Cables (See Wires and Cables)

Cambric Tapes, Yellow and Black
Irvington Varnish & Insulator Co.

Cambric, Yellow and Black Varnished
Irvington Varnish & Insulator Co.

Carbon Brushes (See Brushes, Carbon)

Car Panel Safety Switches
Westinghouse Elec. & Mfg. Co.

Cars, Dump
Differential Car Co.

Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
Kuhlman Car Co., G. C.
McGuire-Cummings Mfg. Co.
National Ry. Appliance Co.
St. Louis Car Co.
Wason Mfg. Co.

Cars, Second Hand
Electric Equipment Co.

Cars, Self-Propelled
Electric Storage Battery Co.
General Electric Co.

Castings, Brass, Composition or Copper
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.
More-Jones Brass & Metal Co.

Castings, Gray Iron and Steel
American Steel Foundries
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Standard Steel Works Co.
St. Louis Car Co.

Castings, Malleable and Brass
Amer. Brake Shoe & Fdry. Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

Catchers and Retrievers, Trolley
Ackley Brake & Supply Corp.
Earll, C. I.
Electric Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.

Circuit Breakers
Automatic Reclosing Circuit Breaker Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Clamps and Connectors for Wires and Cables
Anderson Mfg. Co., A. & J. M.
Electric Railway Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Cleaners and Scrapers—Track (See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
Ohio Brass Co.

Cleats
National Metal Molding Co.

Clusters and Sockets
General Electric Co.

Coal and Ash Handling (See Conveying and Hoisting Machinery)

Coil Banding and Winding Machines
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

Coils, Armature and Field
Cleveland Armature Works
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Coils, Choke and Kicking
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Coin-Counting Machines
Electric Service Supplies Co.
International Register Co., The
Johnson Fare Box Co.

Commutator Slotters
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Commutator Truing Devices
General Electric Co.

Commutators or Parts
Cameron Electrical Mfg. Co.
Cleveland Armature Works
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Compressors, Air
General Electric Co.
Ingersoll-Rand Co.
Westinghouse Trac. Brake Co.

Compressors, Gas
Ingersoll-Rand Co.

Condenser Papers
Irvington Varnish & Insulator Co.

Condensers
General Electric Co.
Schutte & Koerting Co.
Westinghouse Elec. & Mfg. Co.

Conduit Fittings
Chicago Fuse Mfg. Co.

Conduits Interior
National Metal Molding Co.

Conduits, Underground
Johns-Manville Co., H. W.

Connectors, Solderless
Frankel Connector Co.
Westinghouse Elec. & Mfg Co.

Controller Fingers
Russell Mfg. Co.

Controllers or Parts
Columbia M. W. & M. I. Co.
General Electric Co.
Johns-Manville, Inc.
Russell Mfg. Co.
Westinghouse Elec. & Mfg. Co.

Controller Regulators
Elec. Service Supplies Co.

Controlling Systems
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Converters, Rotary
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Conveying and Hoisting Machinery
Columbia M. W. & M. I. Co.

Copper Wire
Anaconda Copper Mining Co.
Copper Clad Steel Co.

Cord, Bell, Trolley, Register, etc.
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Roebling's Sons Co., John A.
Samson Cordage Works
Silver Lake Co.

Cord Connectors and Couplers
Electric Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car
Brill Co., The J. G.
Ohio Brass Co.
Westinghouse Trac. Brake Co.

Cranes
Niles-Bement-Pond Co.
Whiting Corp.

Cresote
Barrett Co., The

Cresoting
Barrett Co., The

Cross Arms (See Brackets)

Crossing Foundations
International Steel Tie Co.

Crossing Signals (See Signals, Crossing)

Crossings, Frog and Switch
Wharton, Jr., & Co., Wm.

Crossings, Track (See Track, Special Work)

Culverts
Canton Culvert & Silo Co.

Curtains and Curtain Fixtures
Brill Co., The J. G.
Electric Service Supplies Co
St. Louis Car Co.

Cutouts
Chicago Fuse Mfg Co.

Dealers' Machinery
Archer & Baldwin
Electric Equipment Co.
Foster Co., L. B.
Hyman Michaels Co.

Derailing Devices (See also Track Work)
Wharton, Jr., & Co., Wm.

Destination Signs
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

Detective Service
Wish Service, P. Edward

Dogs, Lathe
Williams & Co., J. H.

Door Operating Devices
Consolidated Car Heating Co.
National Pneumatic Co., Inc.
Safety Car Devices Co.

Doors and Door Fixtures
Brill Co., The J. G.
General Electric Co.

Doors, Folding Vestibule
National Pneumatic Co., Inc

Draft Rigging (See Couplers)

Drills, Rock
Ingersoll-Rand Co.

Drills, Track
American Steel & Wire Co.
Electric Service Supplies Co.
Niles-Bement-Pond Co.
Ohio Brass Co.

Drinking Cups, Sanitary Paper
Individual Drinking Cup Co., Inc.

Dryers, Sand
Electric Service Supplies Co.
Zelnicker Supply Co., Inc., Walter A.

Electrical Wires and Cables
American Steel & Wire Co.
Roebling's Sons Co., J. A.

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Allison & Co., J. E.
Archbold-Brady Co.
Arnold Co., The
Byllesby & Co., H. M.
Clark & Co., Mgr., Corp., E. W.
Day & Zimmermann
Feustel, Robert M.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Englehardt W.
Jacobs & Co., J. L.
Jackson, Walter
Kelly, Cooke & Co.
Parsons, Klapp, Brinkerhoff & Douglas
Republic Engineers, Inc.
Richey, Albert S.
Sanderson & Porter
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White Engineering Corp., The J. G.

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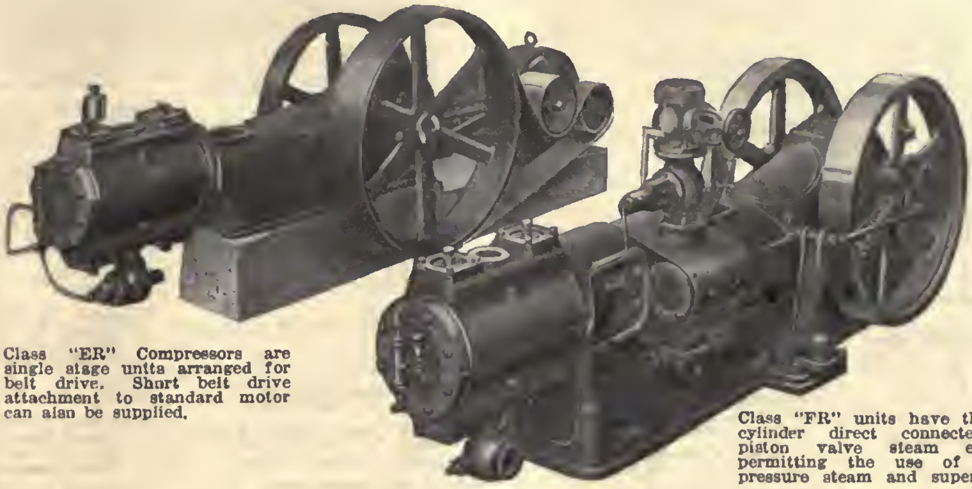

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Brill Co., The J. G.
Cleveland Fare Box Co.
Consolidated Car Fender Co.
Electric Service Supplies Co.

Fibre and Fibre Tubing
Continental Fibre Co.
Johns-Manville Co., H. W.
Westinghouse Elec. & Mfg. Co.

Field Coils (See Coils)

Filters, Water
Scaife & Sons Co., Wm. B.

Floodlights
Electric Service Supplies Co.

Flooring Composition
American Mason Safety Tread Co.

Forgings
Columbia M. W. & M. I. Co.
Standard Steel Works Co.
Williams & Co., J. H.

Foundry Equipment
Whiting Corp.

Frogs, Track (See Track Work)

Funnel Castings
Wharton, Jr., & Co., Inc., Wm.

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Chicago Fuse Mfg. Co.
Columbia M. W. & M. I. Co.
General Electric Co.
Johns-Manville, Inc.
Westinghouse Elec. & Mfg. Co.
Williams & Co., J. H.

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Chicago Fuse Mfg. Co.
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General Electric Co.

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Ohio Brass Co.

Gaskets
Power Specialty Co.
Westinghouse Traction Brake Co.

Gas-Electric Cars
General Electric Co.

Gas Producers
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Brill Co., The J. G.

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Gear Cases
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Electric Service Supplies Co.
Westinghouse Elec. & Mfg. Co.

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Electric Service Supplies Co.
General Electric Co.
National Railway Appliance Co.
Nuttall Co., R. D.
Tool Steel Gear & Pinion Co.

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General Electric Co.

Generators
General Electric
Westinghouse Elec. & Mfg. Co.

Gongs (See Bells and Gongs)

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Morganite Brush Co., Inc.

Grates, Chain
Green Eng. Co.

Greases (See Lubricants)

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Railway Track-work Co.

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Railway Track-work Co.

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Electric Service Supplies Co.
Ohio Brass Co.

Harps, Trolley
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
More-Jones B. & M. Co.
Nuttall Co., R. D.
Star Brass Works

Headlights
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General Electric Co.
Ohio Brass Co.
St. Louis Car Co.

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Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
National Ry. Appliance Co.
Smith Heater Co., Peter.

Heaters, Car, Hot Air and Water
Cooper Heater Co.
Smith Heater Co. Peter

Heaters, Car (Stove)
Electric Service Supplies Co.
Smith Heater Co., Peter

Hoists and Lifts
Columbia M. W. & M. I. Co.
Ford-Chain Block Co.
Niles-Bement-Pond Co.

Hose
Ingersoll-Rand Co.

Hose, Bridges
Ohio Brass Co.

Hydraulic Machinery
Niles-Bement-Pond Co.

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Schutte & Koerting Co.

Inspection
Electrical Testing Lab's

Instruments, Measuring, Testing and Recording
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General Electric Co.
Johns-Manville Co., H. W.
Standard Underground Cable Co.
Westinghouse Elec. & Mfg. Co.

Insulating Materials, China & Porcelain
Jeffrey-Dewitt Insulator Co.

Insulating Varnishes
Irvington Varnish & Insulator Co.

Insulation (See also Paints)
Anderson Mfg. Co., A. & J. M.
Electric Ry. Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Johns-Manville, Inc.
Westinghouse Elec. & Mfg. Co.

Insulators, China, Porcelain & Composition
Jeffrey-Dewitt Insulator Co.

Insulators (See also Line Material)
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Drew Electric & Mfg. Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Johns-Manville, Inc.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Insulator Pins
Electric Service Supplies Co.
Hubbard & Co.

Insulators, Section
Flood City Mfg. Co.

Jacks (See also Cranes, Hoists and Lifts)
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Columbia M. W. & M. I. Co.

Joints, Rail
Lackawanna Steel Co.
Rail Joint Co.
Zelnicker Supply Company, Inc., Walter A.

Junction Boxes
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Brill Co., J. G.

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Westinghouse Elec. & Mfg. Co.

Lamps, Arc and Incandescent (See also Headlights)
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General Electric Co.
Westinghouse Elec. & Mfg. Co.

Lamps, Signal and Marker
Ohio Brass Co.

Lathe Attachments
Williams & Co., J. H.

Lathes, Car Wheel
Niles-Bement-Pond Co.

Lightning Protection
Anderson Mfg. Co., A. & J. M.
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General Electric Co.
Ohio Brass Co.
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Columbia M. W. & M. I. Co.
Drew Electric & Mfg. Co.
Electric Railway Equipment Co.
Electric Service Supplies Co
General Electric Co.
Hubbard & Co.
Johns-Manville Co., H. W.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

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Westinghouse Elec. & Mfg. Co.

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Texas Co.
Universal Lubricating Co.

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Niles-Bement-Pond Co.

Machine Work
Columbia M. W. & M. I. Co.

Magnet Wire
Belden Mfg. Co.

Manganese Steel Castings
Wharton, Jr., & Co., Wm.

Manganese Steel Special Track Work
Wharton, Jr., & Co., Wm.

Meters (See Instruments)
Electric Service Supplies Co.

Mirrors for Motormen
Drew Elec. & Mfg. Co.

Molded Insulations & Parts
Belden Mfg. Co.

Molding Metal
National Metal Molding Co.

Money Changers
Galef, J. L.

Motormen's Seats
Brill Co., J. G., The
Electric Service Supplies Co.
Wood Co., Chas. N.

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Westinghouse Elec. & Mfg. Co.

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General Electric Co.

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Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Hubbard & Co.
Lackawanna Steel Co.

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Schutte & Koerting Co.

Oils (See Lubricants)

Packing
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Paints and Varnishes for Woodwork
National Ry. Appliance Co.

Paving Blocks
Northern Granite & Stone Co.

Paving Material
American Brake Shoe & Fdry. Co.
Barrett Co., The
Northern Granite & Stone Co.

Paving Pitch
Barrett Co., The

Pickups, Trolley Wire
Electric Service Supplies Co.
Ohio Brass Co.

Pinion Pullers
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co
Wood Co., Chas. N.

Pinions (See Gears)

Pins, Case Hardened, Wood and Iron
Bemis Car Truck Co.
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse Traction Brake Co.

Pipe
National Tube Co.

Pipe Fittings
Power Specialty Co.
Standard Steel Works Co.
Westinghouse Traction Brake Co.

Planers (See Machine Tools)

Pliers, Insulated
Electric Service Supplies Co.

Plugs
National Metal Molding Co.

Pneumatic Tools
Ingersoll-Rand Co.

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Electric Railway Equipment Co.
Hubbard & Co.

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Duncan Lumber Co.
Page & Hill Co.

Poles, Trolley
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
National Tube Co.
Nuttall Co., R. D.

Poles, Tubular Steel
Electric Railway Equipment Co.
National Tube Co.

Poles and Ties Treated
Bennett-Field Cross Tie Co.
Duncan Lumber Co.
Page & Hill Co.

Power Saving Devices
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Preservatives
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Pressure Regulators
General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Pumps
Schutte & Koerting Co.

Punches, Ticket
Bonney-Vehslage Tool Co.
International Register Co., The
Wood Co., Chas. N.

Purifiers, Feed Water
Scaife & Sons Co., Wm. B.

Rails
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Lackawanna Steel Co.

Rail Grinders (See Grinders)

Rail Joint Plates
Lackawanna Steel Co.

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Zelnicker, Walter A., Supply Co., Inc.

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Rattan
Brill Co., The J. G.
Electric Service Supplies Co.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.

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Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Rooke Automatic Register Co.

Reinforcement, Concrete
American Steel & Wire Co.
Lackawanna Steel Co.

Repair Shop Appliances (See also Coil Banding and Winding Machines)
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

Repair Work (See also Coils)
Cleveland Armature Works
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Replacers, Car
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

Resistance, Grid
Columbia M. W. & M. I. Co.

Resistance, Wire and Tube
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Retrievers, Trolley (See Catchers and Retrievers, Trolley)

Rheostats
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Roof Building
Barrett Co., The

Rosettes
National Metal Molding Co.

Rubber Covered (Wire and Cables)
Belden Mfg. Co.

Sanders, Track
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Ohio Brass Co.
St. Louis Car Co.

Sash Fixtures, Car
Brill Co., The J. G.

Scrapers, Track (See Cleaners and Scrapers, Track)

Seating Material
Brill Co., J. G., The

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WHEN TO RECLOSE

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Barrett
B
Carbosota
Grade-One Liquid
Creosote Oil

Brush-treating pole. Note use of mop.

What is the Life of a Pole?

DECAY destroys 95% of all poles. Insects destroy 4%. Mechanical abrasion destroys 1%. The life of a pole, therefore, depends almost entirely upon its resistance to decay.

At the present rate of consumption the supply of cedar poles will soon be exhausted and more costly substitutes, of proper strength and serviceability, will have to be found, *unless this tremendous waste from decay is checked.*

Fortunately the remedy is at hand. Carbosota Liquid Creosote Oil offers a practicable, effective and inexpensive means of meeting the situation.

For nearly a century the unequalled properties of creosote oil as a wood preservative have been fully recognized. Experience has shown that non-pressure processes are the only practicable methods for treating cedar and chestnut poles; that the butts of all poles used in "permanent" construction should be treated by the Open Tank process, and that, for temporary lines simple Surface treatment is entirely adequate.

Carbosota Liquid Creosote Oil is the standard wood preservative for all non-pressure treatments.

The Barrett Company offers you, free of charge, the services and advice of its technical experts for determining upon a standard practice of wood-preservation, adapted to your particular conditions and requirements. Ask for Pole Folder, No. 406.

(Poles should be thoroughly seasoned, especially when surface treatments are to be applied, and the portion to be treated, carefully cleaned of all adhering inner bark.)

Decay is the greatest enemy of poles. Creosoting protects poles effectively.

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Automatic Safety and Automatic Return Switch Stands for Passing Sidings. Tee Rail Special Work for Interurban Lines and Private Rights of Way. Manganese Construction a Specialty.

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will locate the
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Position you want
Equipment you want

Are you using the Searchlight?

59

Collier Service

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Because of this co-operation their confidence in car-card advertising has remained undiminished despite the enormous development of other forms of advertising since Collier Service was originated.

That is where our co-operation with *you* comes in—for it is the advertiser's confidence in Collier Service that keeps car-card advertising a source of permanent revenue to the electric railway.

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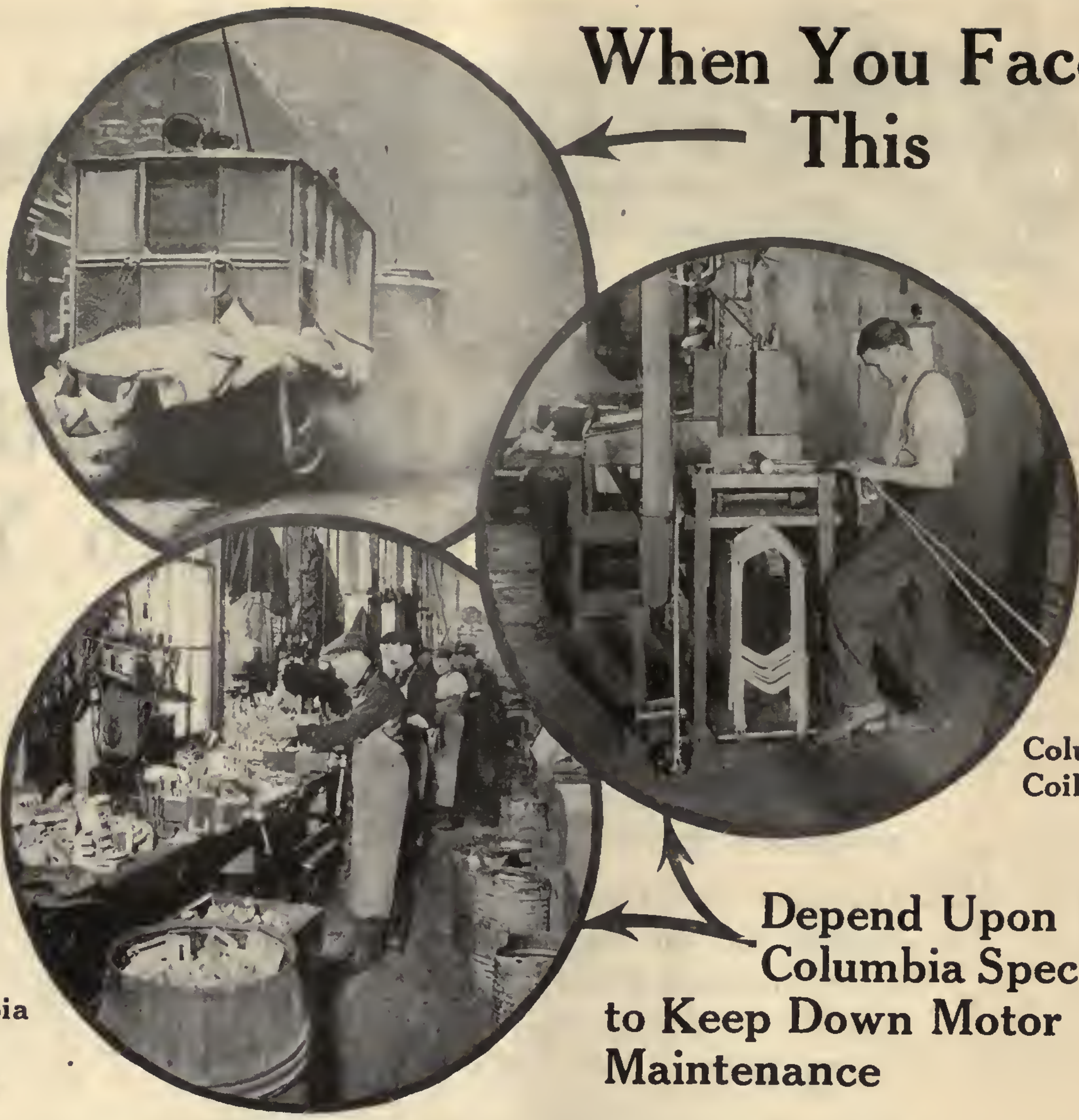
INCORPORATED
Candler Building, New York

When You Face This



Columbia Coils

Columbia Brush Holders

Depend Upon These Columbia Specialties to Keep Down Motor Maintenance

Last winter brought about a heavy mortality among armatures that meant thousands of dollars loss to the electric railway industry. This winter the story will be a *different one* on your road, if your are using Columbia-made coils and Columbia Brush Holders. As this Journal points out, an improved method of rewinding armatures is an essential. Columbia made coils are especially designed and wound for rewinding old armatures because unusual care is needed. Additional insulation is always necessary at corners and between leads where the clearance with core is small. In addition the large radius bends give greater flexibility. Cores that have been opened up during heavy service and have laminations that are bent or that have projections caused by bumping armatures against pole faces can best be wound with Columbia-Made Quality Coils because these conditions are taken into account in their manufacture. And—some of the biggest electric railways in the country are steadv users of Columbia Brush Holders.

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Commutators
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The Place For Birney Safety Cars

1. On Heavily Traveled Lines in all-day service and supplemented during peak periods with large-capacity, front-entrance, center-exit cars.
2. On Lightly Traveled Lines where an improved service with short headways will stimulate car riding.
3. On Suburban Lines under a shorter headway schedule than maintained by other types of cars.
4. On Minimum Service Lines where the franchise demands some service.
5. In Owl Service, where more frequent service will improve public relations.

4—On Minimum Service Lines

The franchise under which a railway company operates ofttimes demands service on lines where the travel is insufficient to meet operating expenses. The installation of Birney Safety Cars on such lines will, at least, reduce operating costs, and a more frequent service, possible with Birney Safety Cars, will stimulate travel and, consequently, increase revenue.

Unprofitable lines are made profitable with Birney Safety Cars.

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TRADE MARK
SAFETY
CAR

Memo

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OVER

2800

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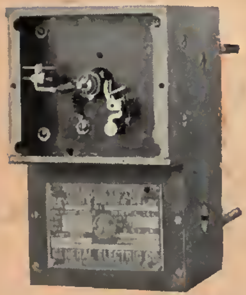
ST. LOUIS MO. CLEVELAND, OHIO. SPRINGFIELD, MASS.

Saving man-power by installing automatic control in substations is one way of equalizing the rising costs in electric railway operation.



Under Voltage Relay.

Automatic Means Economic

The first automatic railway substation in America was installed on the Elgin (Ill.) and Belvidere Electric Railway six years ago. It was G-E equipped.

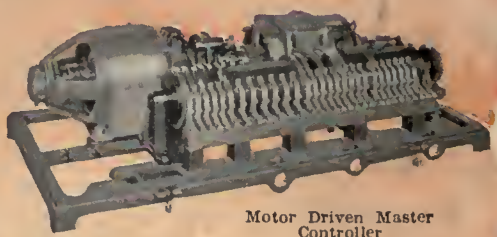
For this and other interurban railways the automatic substation permits a great saving in labor. Through higher voltage and better regulation the automatic raised schedule speed and improved car lighting.

Installed on city railways the results are even better. By automatizing seven stations the Des Moines City Railway, also a user of G-E apparatus, cut down power cost, seven distribution centers replacing three, new feeder cables were made unnecessary for five years and some existing copper was actually taken down and sold as excess. Transmission losses were cut in half and schedule speeds raised. These helped to offset expense increases enormously, and reduced the road's dependence on the human element.

Today there are 12 G-E automatic substations in operation on the Des Moines City Railway lines.

Underload Relay.

Voltage Relay for Generator or Rotary Converter Starting



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ELECTRIC RAILWAY JOURNAL

Announcement

The advent of Ringsdorff Brushes has marked an epoch in the Carbon Brush Industry.

The promise of *Efficiency, Economy, Uniformity* long sought for, has at last been fulfilled.

The Satisfactory performance of Ringsdorff Brushes is assured by the scientific principles under which they are manufactured.

Endless experimentation is no longer necessary.

One prescription of Ringsdorff Brushes will convince you.

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District Engineers, all principal cities

While in Chicago Attending the

American Electric Railway Association Meeting on February 10th

Don't Fail To:

(1) See the wonderful Chicago, North Shore and Milwaukee Railroad with its fast high-class passenger service and modern parcel dispatch system. The passenger train service includes parlor and dining car accommodations between Chicago and Milwaukee. All of the modern passenger and dispatch cars on this road are equipped with HL control and 140-hp. Westinghouse No. 557 motors. In conjunction with the merchandise dispatch and other freight service of the North Shore, the Northwestern Elevated Railroad handles at the Chicago end of the line, carload freight with two 50-ton Baldwin-Westinghouse Electric Locomotives. This is the first and only revenue surface freight operation by electricity in the City of Chicago.

Ask the officials what they think about their growing merchandise-dispatch, freight and passenger business.

(2) Be sure to study the splendid lines and general construction of the very latest trailer car operating in Chicago. It was designed and built by the Chicago Surface Lines. Westinghouse motors on the Chicago Surface Cars, as elsewhere over the country, are rendering excellent service.

(3) Visit the Northwest Station of the Commonwealth Edison Company where there are in operation Westinghouse Turbine Units of 35,000 kw. capacity. These are the largest tandem compound turbine units ever built, and are served by Westinghouse surface condensers and other auxiliaries.

(4) See the modern cars of the elevated lines in Chicago. All of them purchased during recent years are equipped with Westinghouse HL Control. Some of the latest cars are operated with Westinghouse No. 567 field-control motors.

(5) Run up to Milwaukee and see the latest type of city cars which weigh 30,000 lbs., operated by Westinghouse No. 508 motors. Also, see the multiple-unit city cars, operated in trains by HL control and Westinghouse No. 306 motors. Interest will also be found in the three-truck units which accommodate 106 seated passengers with a crew of only two men.

(6) Pass through Cleveland. It will pay you to stop and visit the Cleveland Railways and see the 3,000-kw. automatic substation in action. This is the largest full-automatic station in operation anywhere.

Westinghouse Electric & Manufacturing Co.
East Pittsburgh, Pennsylvania

W
WESTINGHOUSE ELECTRIC

Vol. 57, No. 6 New York, February 5, 1921 *Pages* 251-292

Electric Railway Journal

Henry W. Blake and Harold V. Bozell, Editors Henry H. Norris, Managing-Editor

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McGRAW-HILL COMPANY, INC., Tenth Ave. at 36th St., NEW YORK

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MEMBER AMERICAN ELECTRIC RAILWAY ASSOCIATION AERA 1921

The annual subscription rate is $4. Extra zone postage west of the Mississippi, and in Alaska, Hawaii, the Philippines, Porto Rico, Canal Zone, Cuba and Mexico, 60 cents. Extra postage is Canada, $1.50. Extra Foreign postage, $3 (total $7, or 29 shillings). Single copies, 20 cents.

Change of Address—when change of address is ordered the new and the old address must be given. Notice must be received at least ten days before the change takes place.

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SINCE 1869

FOURTEEN years before the first practical electric traction railway line in the United States was built by Field & Edison at the Chicago Railway Exhibit (1883), the Westinghouse Air Brake had proved its indispensability in the realm of rail transportation.

Thus when the traction industry was born it found awaiting it that which was essential to its permanency and success—an efficient braking system.

The industry has grown by leaps and bounds but it has never reached any stage in its development that it did not find a Westinghouse brake exactly meeting its requirements.

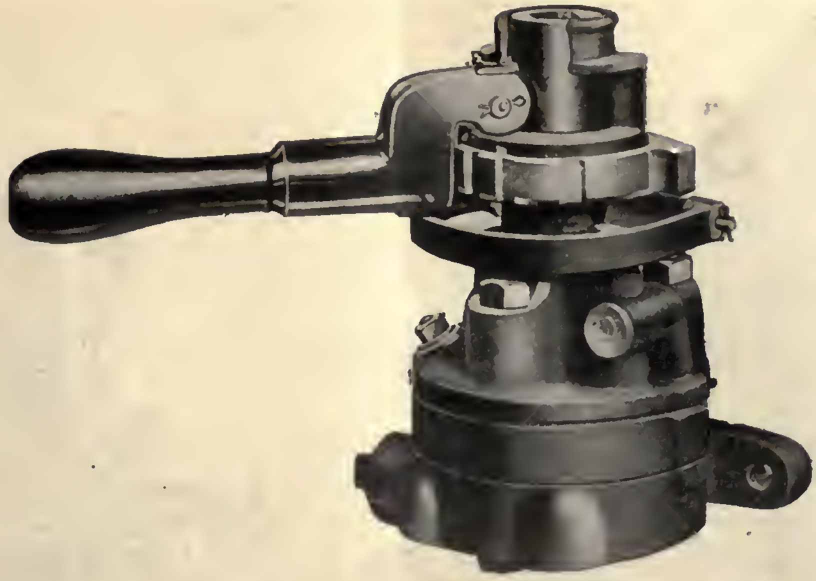
The smallest, lightest car in operation today is controlled by a Westinghouse brake which gives just the right degree of efficiency with regard to economy and safety, and the longest, heaviest, fastest electric trains likewise are equipped with systems evolved especially for that particular form of operation.

There are suitable brakes for every class of electric service—and we build them all.

The Westinghouse Traction Brake Co.

General Office and Works, Wilmerding, Pa.
"Fourteen Miles East of Pittsburgh"

New York Washington, D. C. Chicago
San Francisco Pittsburgh St. Louis



Air Brake and Safety Car Control Equipment

At Gary, Indiana, in the heart of the steel mill district, Safety Cars are making possible a service that is entirely satisfactory to civic authorities, public, car operators and railway officials.

Here in Gary, where peak loads are unusually heavy, schedules are maintained and traffic handled with ease at all times.

For economy of operation and maintenance and a service that means increased revenue it will pay you to operate Safety Cars. But remember—it is a Safety Car only when equipped with automatic laborless apparatus, so interlocked that, regardless of the illness or distraction of the operator, the power will be cut off instantaneously, the air brakes and sands apply immediately thereafter and the doors unlock for safe and easy exit. Furthermore, it is a Safety Car only when the doors must be closed before the car can start, and when the air brake must be applied before the doors are opened and the step lowered in bringing the car to a service stop.

SAFETY CAR DEVICES COMPANY

Main Office—Boatmen's Bank Bldg., ST. LOUIS, MO.

CHICAGO
Railway Exchange Bldg.

WASHINGTON, D. C.
Munsey Bldg.

NEW YORK
City Investment Bldg

PITTSBURGH
Westinghouse Bldg.

SAN FRANCISCO
Southern Pacific Bldg.

CANADA—Canadian Westinghouse Co., Ltd., Hamilton, Ont.

Phono-Electric

For City or Interurban Car Requirements

Because this No. 00 round wire is Phono-Electric Trolley Wire, there is no question that it will continue to make good for years at this intersection, where trains of the big Seattle interurban cars pass over the city tracks.

Naturally, these big-car trains draw heavier amperage than ordinary cars, but the ability of Phono-Electric to withstand high "drafts"—which means high temperature, without losing its remarkable strength and toughness (and without permanent elongation) insure a far longer period of uninterrupted service than would be possible with any other practicable conductor.

Bridgeport Brass Company

Bridgeport Connecticut

2226

Obvious Savings Follow Good Rail Bonding

One moderate sized property was spending two thousand dollars a month on motor repairs until the difficulty was traced to the return circuit and corrected by O-B Bonds.

Any railway can put a millivoltmeter across a poorly bonded joint and find a steady drain on the coal pile.

When good bonding is installed even the passenger (especially near the end of the line) notices the better light for his newspaper, the quicker pick up of the cars.

THE OHIO BRASS COMPANY, Mansfield, Ohio

Manufactures:
Trolley Materials, Rail Bonds,
High Tension Insulators,
Third Rail Insulators.

New York, Philadelphia,
Chicago, Pittsburgh,
Los Angeles, San Francisco,
Paris, France.

"You Are Paying More for Poor Bonding Than Good Bonding Costs." O-B Bonds Are Good Bonds. A few representative types are shown here.

Type AW-3 Bond for Ball of Rail. Also made for Base of Rail.

O-B Arc Weld Bonds have four fundamental features which simplify installation and make a better weld possible.

Type ST-2 Bond.

O-B Gas Weld Bonds were pioneers. They are still first.

Type F-3 Bond.
Concealed Type of Bond, installed under splice bar.

Type E-2 Bond.
A long bond for around the splice bar. Especially valuable on joints where rail movement is considerable.

O-B Stud Terminal Bonds are made in all lengths and capacities with either compressed or pin driven terminals.

UNION Style "L" Color Light

SIGNALS
Controlled by Continuous
A.C. TRACK CIRCUITS
Make
MAXIMUM OPERATING SPEED
Possible with
ABSOLUTE SAFETY
To the important freight and passenger traffic now moving over the entire 660 miles of the St. Paul's electrified divisions through the Rockies and Cascade Range.

THE CHICAGO MILWAUKEE AND ST. PAUL RAILWAY

Automatic Color Light Signals on
Electrified Divisions of the Chicago, Milwaukee & St. Paul Rwy.

"Union" Standard Uniform Equipment Throughout

Trade Mark

Union Switch & Signal Co.

SWISSVALE, PA.

Trade Mark

Low First Cost Plus Permanence

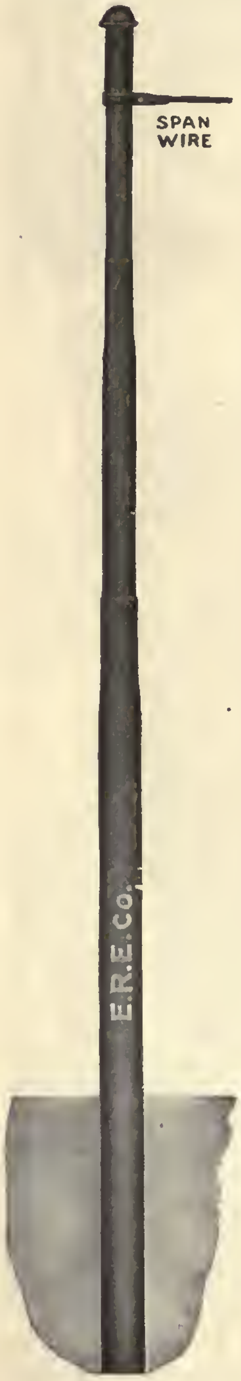
When we attempt to reflect here the opinion of users of STEEL TWIN TIE TRACK we pick this phrase.

Our conviction that this combination of economy and permanence is the outstanding characteristic of STEEL TWIN TIES is fostered by our rapidly growing business with representative railway companies.

THE INTERNATIONAL STEEL TIE CO.
Cleveland, Ohio

Steel Twin Tie Track

PRICES REDUCED



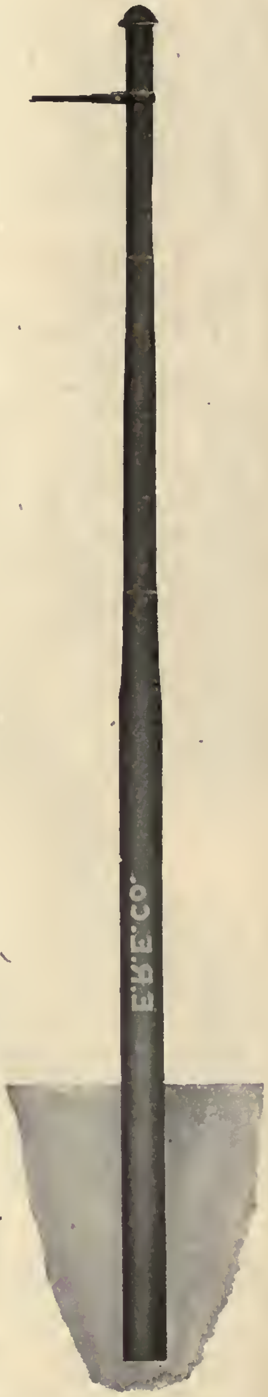
WE announce: effective at once, a substantial reduction in the price of

Elreco Tubular Steel Poles

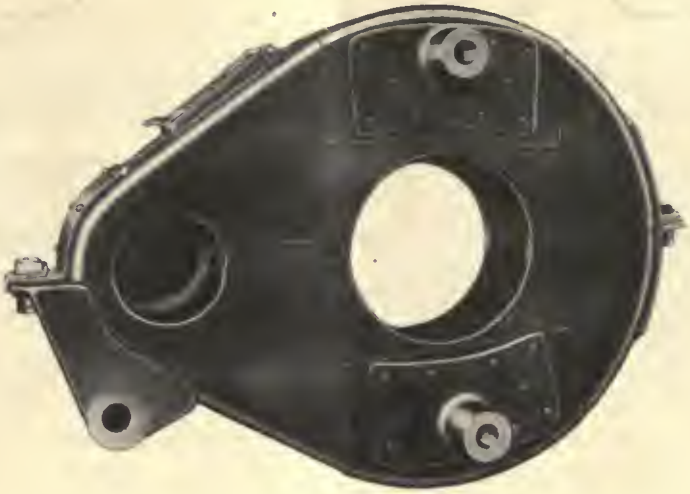
Further delay in reconstruction work or extensions is now unnecessary because prices of Elreco Steel Poles are practically normal, the reduction amounting to $15 per ton.

In order to insure delivery for spring construction, it is necessary that orders be placed now.

A letter or wire will bring you full information



Electric Railway Equipment Company
Cincinnati, Ohio
30 Church Street, New York City



The Gear Case for Real Service - KEYSTONE

The first of four carloads of Keystone Steel Gear Cases to Chicago Surface Lines

Keystone Steel Gear Cases have proven their ability to withstand vibration, jolts, jars and knocks from road-bed obstructions. They are made of soft special analysis steel of extra quality—the best to resist vibration. They are both riveted and electrically spot-welded—the rivets supply holding strength and the spot welds reinforce the rivets by preventing slippage. They are made with steel, malleable and forged steel brackets which are carefully designed and welded and riveted in place.

They are made for use with practically every type of railway motor—every type of case being of standard Keystone construction. Hundreds of the largest operating companies are using Keystone Gear Cases—Why not yours?

Write for data sheets

ELECTRIC SERVICE SUPPLIES CO.

Manufacturer of Railway Material and Electrical Supplies

PHILADELPHIA
17th and Cambria Streets

NEW YORK
50 Church St.

CHICAGO
Monadnock Building

Canadian Distributors: Lyman Tube & Supply Co., Ltd., Montreal, Toronto

The Transmission of Power

Hydro-electric development on a large scale is made possible only because the current developed can be carried for miles without appreciable loss in transmission.

Copper, on account of its conductivity which is higher than that of any other conductor used for the transmission of electrical power—because of its great tensile strength and reclamation value—is the ideal metal for all transmission purposes.

Anaconda Copper Wire is made from pure electrolytic copper, of average conductivity of 100.75% Mathiessen's Standard.

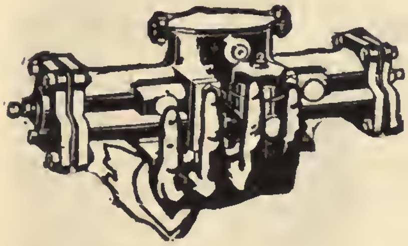
Buy and specify Anaconda—"From ore to Finished Product."

ANACONDA COPPER MINING COMPANY
Rolling Mills Department
Mills—Great Falls, Montana
General Office: 111 *W. Washington St., Chicago*

Chicago's two-car train with new trailer and remodeled motor car

Standardize! *Pneumatize!*

Chicago Surface Lines Start Train Operation Right



When the Chicago Surface Lines decided that the time for train operation was ripe, they realized that pneumatized cars were a necessity if the utmost in schedule speed and track capacity was to be attained.

And so the management ordered the installation on the first fifty trailers of National Pneumatic Door Control and Safety Interlocking Door Control toward the ideal of securing two (or more) cars with but a single thought.

And that thought being to carry safely the largest number of passengers in the shortest possible time.

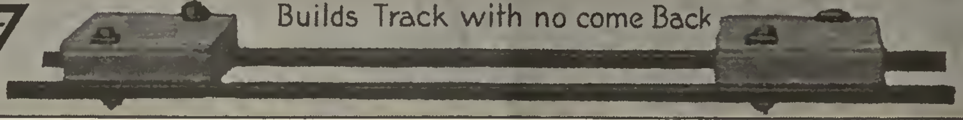
Make your peak periods produce maximum profit and efficiency

National Pneumatic Company, Inc.
50 Church St., New York Edison Bldg., Chicago
Works: Rahway, N. J.

Manufactured in Canada By
Dominion Wheel & Foundries, Ltd., Toronto, Ont.

The RESILIENT RAILWAY TIE

Builds Track with no come Back



Build a Track with No Come-back

First cost and maintenance are the two important points for consideration in track construction. The Dayton *Resilient* Tie, answers these two all important questions.

The first cost is less than any other method of construction, and the *Resilient* feature increases the life of the track and pavement—hence lower maintenance.

Write us now for detailed information as to cost, service and delivery and be prepared when the construction season opens.

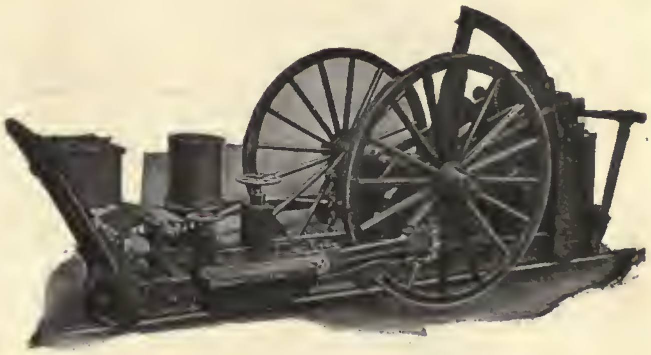
THE DAYTON MECHANICAL TIE CO., 704 COMMERCIAL BUILDING, DAYTON, OHIO

The selection of Grinding Equipment should depend wholly upon the condition of your track and the work to be done

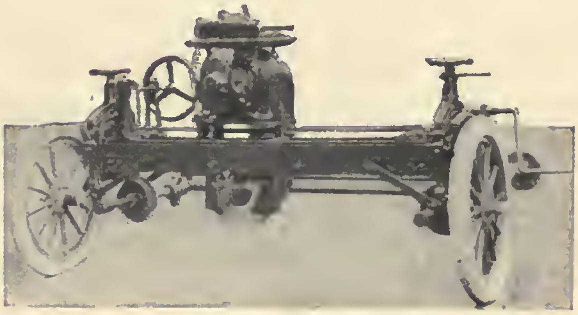
To take one example from the many—

The Reciprocating Track Grinder is superior to all others for removing rail corrugations and grinding slightly cupped joints.

The Universal Rotary Track Grinder and the Atlas Rail Grinder should be used for removing surplus metal after welding.



Reciprocating Track Grinder



Universal Rotary Track Grinder

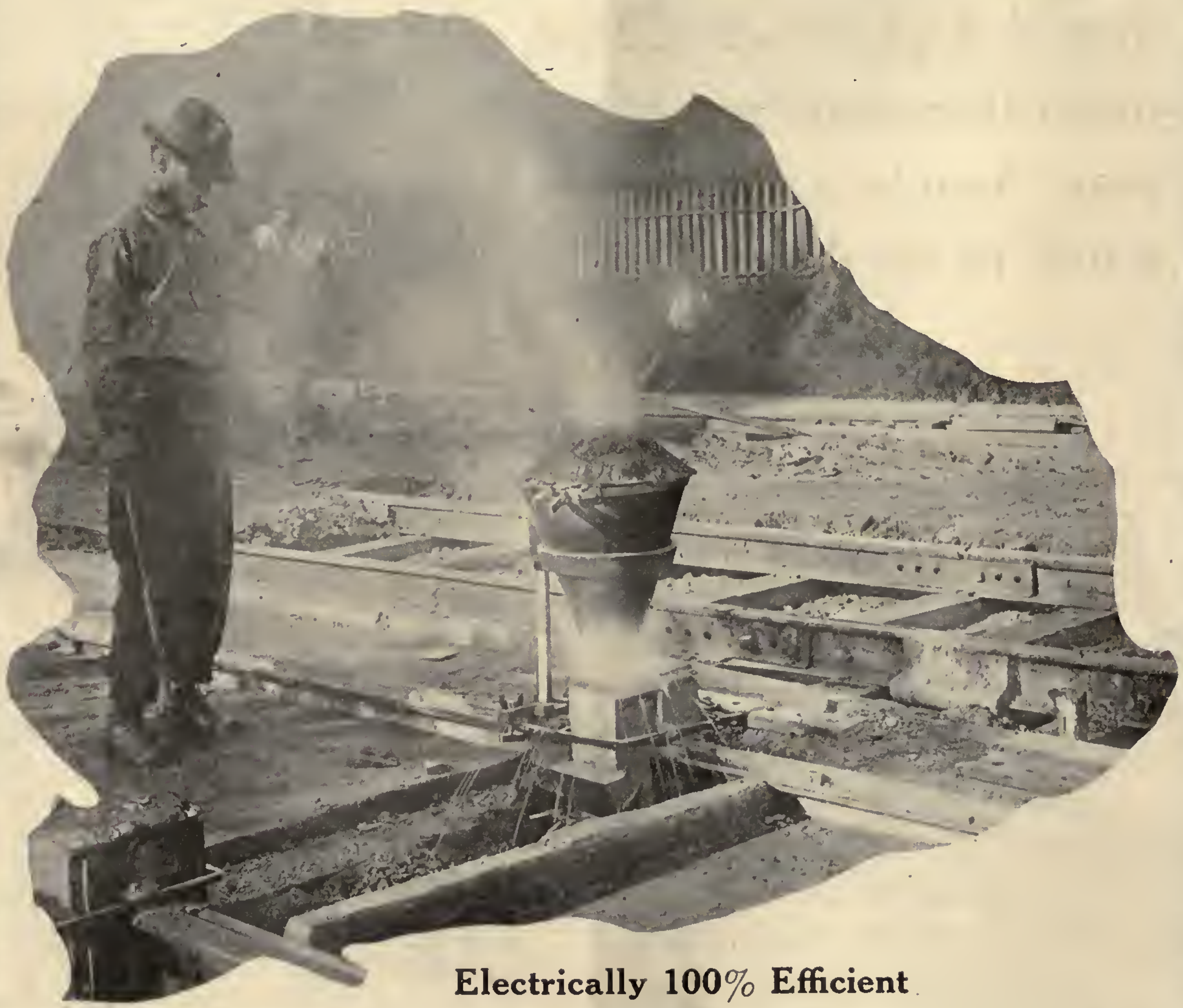
Atlas Rail Grinder

Railway Track-Work Company

3132-48 E. Thompson St.
Philadelphia, Pa.

ATLAS RAILWAY SUPPLY CO., Chicago, Ill.
CHAS. N. WOOD CO., Boston, Mass.
ELECTRICAL ENGINEERING & MANUFACTURING CO.
Pittsburgh, Pa.
HITCHCOCK, LLOYD & CO., Inc., 77A Queen Victoria St., E. C.
London, England

Thermit Insert Rail Welding



Electrically 100% Efficient

From an electrical standpoint alone the Thermit insert rail weld offers advantages which cannot be ignored.

Failure to conduct all the electricity through the rails to the power house means more than a loss of energy; it means electrolysis and interference with nearby low voltage circuit.

To supplement a mechanical joint with an electrical joint, be it of solid copper, ribbon copper or strand copper, would seem to be a comparatively simple matter: but the difficulty is to secure a bond between the copper and the rail that no insulating film of air or oxide will tend to deflect the flow of the return current. Compressed and pin terminal bonds will work loose or the metal will become brittle under vibration. Soldered bonds call for the higest skill in application and yet are very liable to oxidation. Compressed bonds are subject to vibration, corrosion, electrolytic action and theft. None of these bonds maintains its original efficiency indefinitely.

On the other hand, the Thermit rail weld continues efficient for years of service because it is simply a continuation of the running rail itself without plugs, pins, solder, amalgam or other outside conductors. The full section weld that makes it a perfect mechanical joint also makes it 100 per cent efficient electrically.

Send for our Rail Welding Pamphlet 3932

METAL & THERMIT CORPORATION

Boston
Pittsburgh
Chicago

120 Broadway New York

SERVICE STRENGTH THERMIT WELDING ECONOMY

Toronto
San Francisco

Welding a Lincoln Bond in 45 Seconds

Holding the Lincoln Bond in a carbon mold against the rail by a clip, the welder applies the carbon arc with current from the R.W.B. Dynamotor, quickly forming a head permanently welded to the rail. The R.W.B. portable Dynamotor, takes the current from the trolley wire and converts it into low voltage exactly suitable for welding purposes.

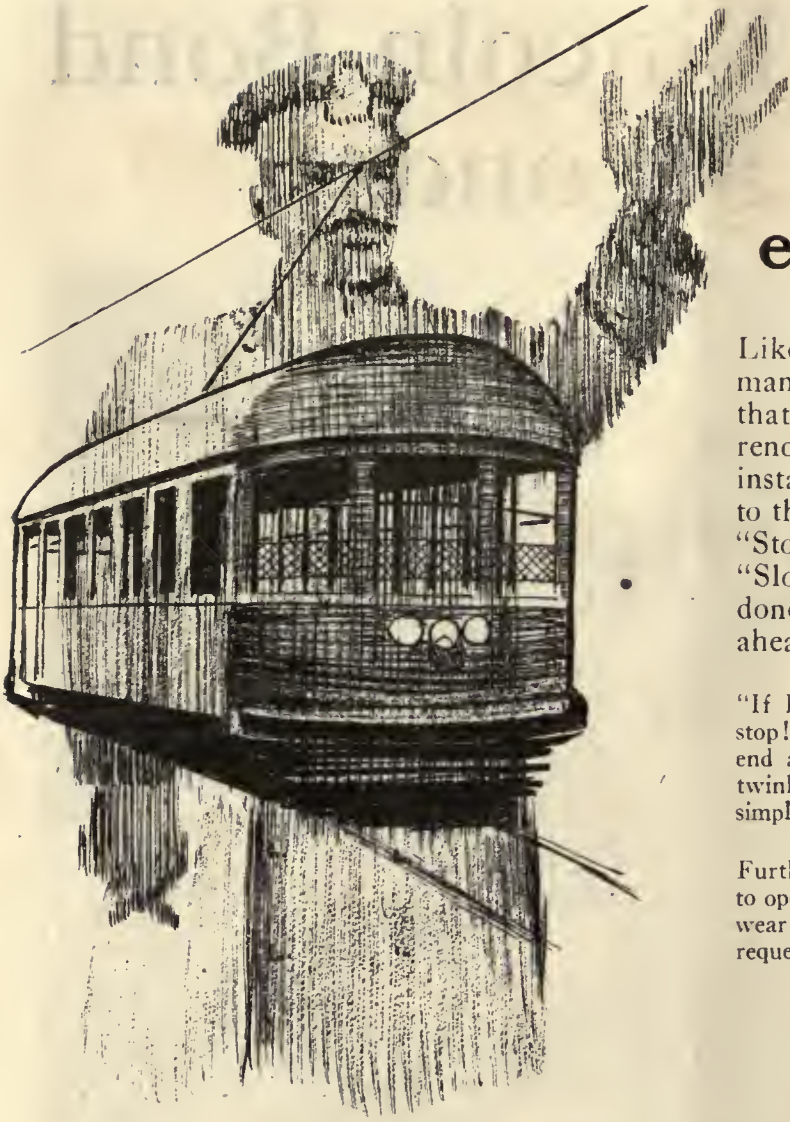
To weld a Lincoln Bond to the track in 45 seconds seems like an exaggeration, but it's not. Scores of welders on various well known lines are doing it daily with the R.W.B. Dynamotor—and the permanence and low cost of the work delight every maintenance of way engineer.

The equipment is extensively used for Rail Joint, Track and Shop Welding.

Drop us a line and we'll send you some mighty interesting information on bonding and welding.

RAIL WELDING AND
BONDING COMPANY
Formerly The Lincoln Bonding Co.
Cleveland, Ohio

OFFICES
New York London Chicago



Like a Traffic Cop to protect each separate car!

Like a wireless message from one motorman to another—this is the protection that Nichols-Lintern Indicating Signals render. They flash their signals, in instant accord with the motorman's move, to the car or truck or wagon following—"Stop" — or "Full speed ahead" — or "Slowly"—telling just what is being done, the instant it is done by the car ahead.

"If I'd only *known* he was going to make a quick stop!" is the excuse of many a motorman in a rear-end accident—now he *can* know, by watching the twinkling red and green lights as they flash their simple code message.

Furthermore, he will be able better to coast and to operate his brakes with greater skill thus reducing wear on motors, brakes and trucks. Full details on request. *Write us.*

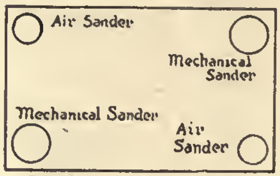
Like an unfailing friend in the moment of emergency

N-L Mechanical Sanders never fail to shoot the sand—*where* wanted—*when* wanted—in the *quantity* wanted. They never fail for lack of air. They need no air.

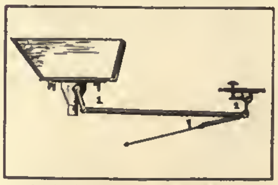
The air can and frequently does—fail just when needed—but never N-L Sanders. A slight foot pressure releases the sand at the instant the hand brake is applied—and the car is *held.*

As an economical device in regular service, N-L mechanical Sanders prevent the motorman from misapplying their control apparatus and flooding the track with sand. Write us for full details.

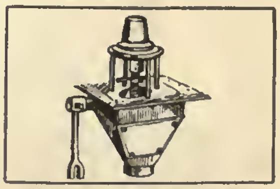
Typical installation showing a car that uses 30% as much sand as when not equipped with N-L Mechanical Sanders.



This is the way we recommend these Sanders be used—giving a properly balanced Sander Equipment.



Here is all there is to it for the Safety Car—rapidly and cheaply installed.



N-L Mechanical Sand Valve. Patented. A slight pressure operates it and motormen say operation is a "cinch."

The Nichols-Lintern Co.

8404 Lorain Avenue **Cleveland, Ohio**

Collier Service

Co-operation with the Advertiser is also Co-operation with You

There are a dozen ways to skimp on the quality car-card publicity if we wanted to skimp—as in design, grade of paper and ink, frequency of change, timeliness of subject advertised, merchandise data, so on.

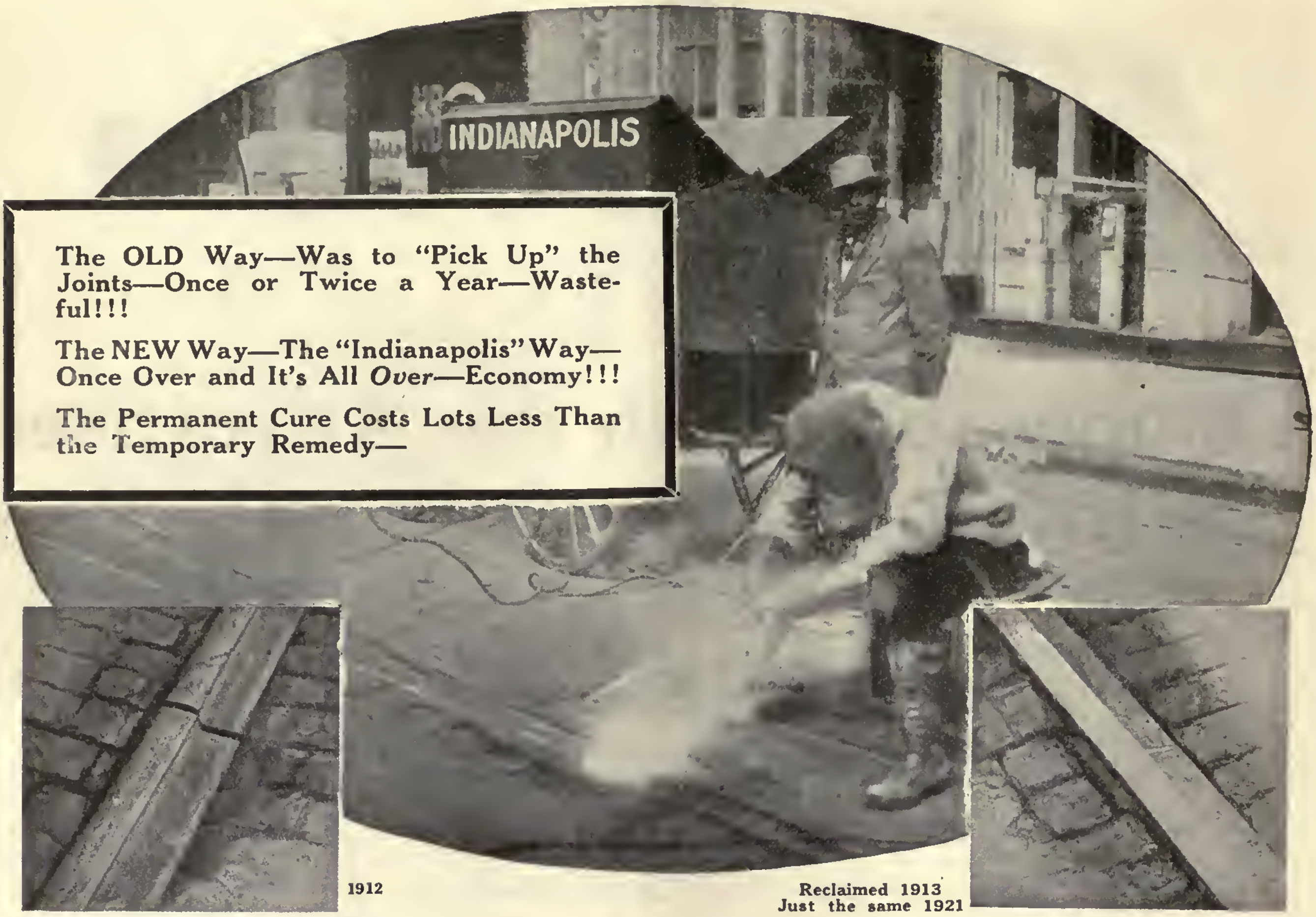
But the fact that Collier Service cars are notable for the large proportion of experienced national advertisers proves that these advertisers realize that they are getting real co-operation in selling their product.

Because of this co-operation their confidence in car-card advertising has remained undiminished despite the enormous development of other forms of advertising since Collier Service was originated.

That is where our co-operation with *you* comes in—for it is the advertiser's confidence in Collier Service that keeps car-card advertising a source of permanent revenue to the electric railway.

Barron G. Collier
INCORPORATED

Candler Building, New York



The OLD Way—Was to "Pick Up" the Joints—Once or Twice a Year—Wasteful!!!

The NEW Way—The "Indianapolis" Way—Once Over and It's All *Over*—Economy!!!

The Permanent Cure Costs Lots Less Than the Temporary Remedy—

1912

Before Reclaiming

Reclaimed 1913
Just the same 1921

After Reclaiming

—*We repeat it*—

"The Greatest Aid of the Way Engineer"

On one hand you have the low joint. It collects water; causes power losses; makes cars bump; riles the passengers; increases track maintenance. The rail ends cup and bend; splice bars are battered down; bonds loosen and come off; and the danger of serious accident creeps nearer and nearer.

On the other hand you have the smooth, easy riding Indianapolis-installed Apex Welded Joint. It has no bolts, no bonds; its conductivity exceeds the unbroken rail; it cuts track maintenance; it saves from the start; and pays for itself in 60 days. And you can install one in 40 minutes! Write—ask how.

"Apex" Joint
for Guard and Girder Rail

**Indianapolis
Switch & Frog Co.
Springfield, Ohio**

Stock Pile, Harvard Yard, Cleveland, Ohio

GRANITE PAVING BLOCK

Combined Service, Durability and Delivery

Transportation facilities during 1920 were such that many shippers despaired — shortage of cars, delays enroute, embargoes — yet we filled the largest number of contracts in the history of our Company, *and without delay.* Not in one single instance was a customer's work stopped for want of material.

The only paving material that lasts indefinitely.

Standard on many roads.

GRANITE
EVERLASTING

THE NORTHERN GRANITE & STONE COMPANY

909 LEADER-NEWS BUILDING, CLEVELAND, OHIO

Prompt shipping facilities by rail or water

Simplifying fare collection

One reason why the Johnson Fare Box is so remarkably efficient—one reason why it cuts out lost motion, saves your conductor's time and decreases stop durations — is because it receives, counts and registers every fare through one hopper.

The Johnson Fare Box handles all classes of fares: nickels, pennies, dimes, metal tickets.

Errors, misunderstandings, arguments are cut to the minimum. Time required for fare collection is shortened at every stop. Schedules are speeded up.

The logical result is better service—a better satisfied public—and a *better satisfied management.* —Johnson Fare Boxes not only improve service and increase patronage, but they also safeguard every fare deposited—a combination that results in a 3 to 10% increase in revenue.

Any of the more than 200 Electric Railways using Johnson Fare Boxes will gladly verify this. Write to them for confirmation and to us for all the facts.

JOHNSON FARE BOX COMPANY

Ravenswood, Chicago, Ill.

Some inside dope on the 1920 World's Series

THIS is not for the eyes of the general public. Only Electric Railway men will be interested. It's a transportation story and tells how the Northern Ohio Traction and Light Co. took care of the thousands of fans who were obliged to travel from Akron to Cleveland in order to make the World's Series a complete success.

This company ran a nine car interurban daily out of Akron, leaving at 10.10 every morning and arriving in Cleveland at 11.40. This was the first time this company ever attempted to operate a nine car train over its property but the job was handled to the benefit of the company and the satisfaction of the fans.

The Universal Lubricating Co.
Offices: Schofield Bldg. Works: Sweeney Ave.
Cleveland, Ohio

TULC
A
LUBRICANT

P. S. This nine car train, illustrated above, was lubricated thruout with Tulc. The Northern Ohio T. & L. Co. gladly tell of results obtained from Tulc. We will give you complete data on money saving lubrication assured by its use.

ACKLEY BRAKES
Found The World Over

Safety Assurance

Higher speeds mean increased revenue
—but not when safety is sacrificed.

ACKLEY BRAKES

are the allies you need for swift and sure braking.

Both the Ackley No-Staff and 2-E represent the highest development in hand brake design. Their quick take-up drums and chain slack adjustment give the next best thing to air for speedy action.

Ackley Brakes
mean increased speed with safety

Let us quote for your new or rebuilt equipment.

WE CAN GIVE PROMPT DELIVERY

The Ackley No-Staff—Bulletin D
The Ackley 2-E (Staff)—Bulletin E

REPRESENTATIVES:
E. A. Thornwell, Atlanta Trust Company Bldg., Atlanta, Ga.
Walter H. Evans, McCormick Building, Chicago, Ill.
A. W. Arlin, Pacific Electric Building, Los Angeles, Calif.
Power Equipment Company, Oliver Bldg., Pittsburgh, Pa.

ACKLEY NO-STAFF TRADE BRAKE MARK

ACKLEY BRAKE & SUPPLY CORPORATION
G.S.ACKLEY & COMPANY. REPRESENTATIVES
50 Church Street, New York U.S.A.
Agencies throughout the World
Cable address "Acklebrake"

ACKLEY 2-E BRAKE

The World's best Lubricants

GALENA QUALITY

1869—1921

The Tests of Time

Day after day, month after month, and year after year, *Galena Oils* have demonstrated their efficiency on American railways by faithful and satisfactory service.

The performance record of these oils is an open book, that may be read in the experience and reported figures of Electric Railways in every state of the Union.

The year of 1920 has added to this illustrious record many instances in which these master lubricants have proved their superiority by service tests on cars and in power houses.

The year 1921 finds Galena Service at its highest point of efficiency, with exceptional resources for conserving the customer's interests, and ever ready to show by actual test the advantages accruing from the use of the scientific methods of lubrication perfected by this company.

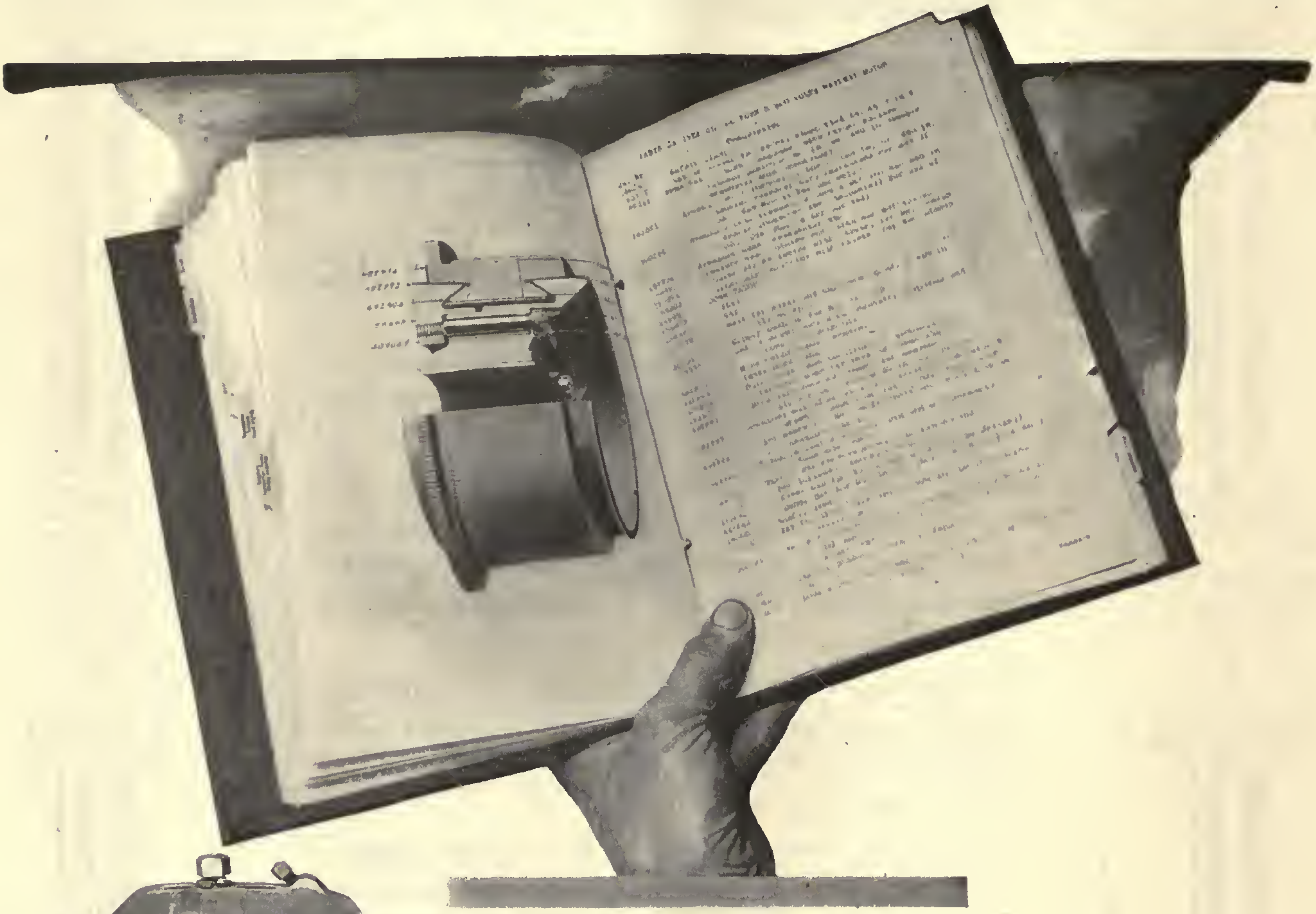
When Galena Service Goes In!
Lubrication Troubles Go Out!

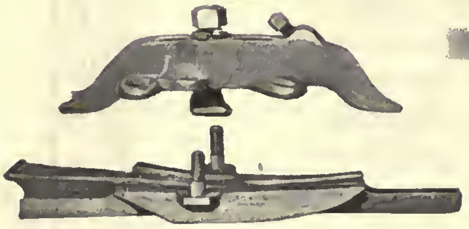
TRIGRAM G S O C TRADE MARK

THE GALENA-SIGNAL OIL CO.
NEW YORK FRANKLIN, PA. CHICAGO
Offices in all principal American Cities
LONDON BUENOS AIRES PARIS

GALENA SERVICE

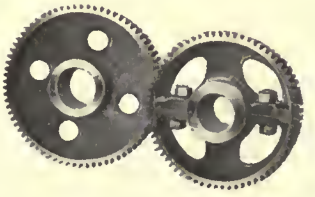
Every good railway man knows he cannot keep his equipment working at high efficiency if he picks renewal parts at random





Form N Removable Pan Trolley Frog.

Porcelain Insulators for Car Resistors.



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Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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Volume 57 New York, Saturday, February 5, 1921 *Number* 6

We're Not Talking to the Right People

THE past few weeks have given added evidence that the best publicity efforts of the industry are very inefficiently utilized. At the last meetings of the Central Electric Railway Association and the Indiana Public Utility Association W. L. Goodwin and E. K. Hall, respectively, gave addresses that would have been of inestimable assistance if they had only been addressed to the public at large. Their value was not all lost, of course, for these men talked with the idea of putting words into the mouths of the railway men to pass along to the public. But, unfortunately, few people, and this includes utility executives, have the gift of talking about their business in a public meeting in a way that both interests and impresses. The efficiency with which these speeches will reach the public is thrice decimated by the absorption power of the man who listened to either, by his probable failure to pass the speech along, and by his poor speaking if he makes the effort.

Ways must be found to get such speakers as those named before the public, so that the latter will hear them at first hand. This fact that addresses such as these are not being made to the right people a good part of the time is not a new thought, but it emphasizes the argument put forth by Mr. Goodwin at Indianapolis recently that what the electric railway companies need are sales managers. It also proves that the publicity problem of the railways now is largely a matter of how to reach the people effectively rather than what to tell them and that every practicable means of publicity must be used.

The Falling Ride Rate Versus Wage and Fare Revision

THE detail statistical reports for the last month or two are not yet to hand, but informal discussions among groups of electric railway men bring out the dour fact that the industrial depression has begun to hit the rate of riding pretty hard. In some places the loss is confined almost entirely to the peak-hour or home-factory traffic, with no diminution in the more voluntary riding. In at least one place, however, there was an abrupt falling off in shopping traffic a full week before Christmas, induced by a panicky feeling among the many foreign workers that the lay-offs were going to last longer and the cuts in wages be more drastic than first expected.

Facts like these indicate that the electric railways are again likely to suffer innocently from what might be termed the "economic lag of a public utility." Yesterday fares or revenues were not permitted to rise as fast as the cost of unregulated commodities. Today, with the fares in many cities at the desired level, the purchasing power and riding necessities of vast masses are greatly decreased long before electric railways can hope to lower their operating expenses per car-mile. For one thing, rents and fuel are still at such high levels and the actual, permanent drop in the cost of food staples is still so uncertain that anything like an early drastic cut in wages is sure to provoke trouble. It is true that track laborers and other small groups, including at least one president and his staff, have already been sliced, but, as all know, the wages of the platform men are the *bête noire*. As a class, these men will stand out for the letter of their contracts, many of which have nearly half a year to run. Under the circumstances, the wisest course for the managements to follow is to secure all possible data on the late adjustments in living costs, so that when the inevitable arbitration proceedings begin they will be prepared to present a case that will meet public sympathy when coupled with the slogan, "We cannot reduce fares in the face of declining traffic unless we can reduce our payments for our two biggest items—coal and labor."

Long-Lived Track and Wood Preservation

THERE has been some disagreement among track engineers on the question of the value and the need for preservative treatment of wood ties when laid in conjunction with well-paved track. Not a little light is thrown on the subject through the article by W. L. Whitlock in the issue of this paper for Jan. 22, wherein the statement is made that treated hemlock ties were found to be in a good state of preservation after twenty-two years of service in the tracks of the Denver Tramway.

Hemlock ties, untreated, have an average life of five years in open track, according to estimates on tie life given in H. F. Weiss' book on timber preservation. On this basis the results reported for the Denver installation indicate that the treatment has increased the life of the tie more than four times the estimated untreated life. Mr. Weiss gives the estimated life of treated hemlock ties in open track as fifteen years. Hence, it may reasonably be argued that the track pavement under which the ties in question have been in service, by keeping the ties in a fixed state of moisture content, has added seven years to the estimated treated life of hemlock ties.

Mr. Whitlock also states his belief that the good waterproof pavement, which was wisely installed when the tracks were built, proved to be a prominent factor in preserving the other parts of the track structure and accounts for the remarkably small amount of deterioration found in all details of the track. This statement fits in with the observations of the editors of this paper to the effect that good pavements are essential to good tracks and that when the water is kept out of the substructure the pavement acts as a real track life preserver. "Keep the water out" has become an axiom in the track engineer's manual.

This information from Denver should lead track engineers to investigate comparative cost of the treated hemlock tie as a substitute for the more expensive oak, yellow pine and chestnut ties which have prevailed heretofore, and a considerable impetus should be given to the use of preservative treatments for ties, no matter what wood they are made of. In this connection it is very opportune that the three standing committees of the Engineering Association which are most concerned with this subject have been asked to prepare reports on wood preservation, because the subject is assuming an increased importance in the search for every available means of reducing maintenance cost.

Action on the Reports at Chicago

THE discussion being published in this paper on the proposed indorsement by the association at the Chicago conference of the reports of the Federal Electric Railways Commission and the Chamber of Commerce committee shows that the difference of opinion on such action centers largely about two points. One of these is clause XV of the federal report, which recommends the adjustment of the capitalization of a railway company to correspond with the valuation of the property employed in public service. The clause reads that a fair valuation of the property of every utility should be made and then that "the company should voluntarily reduce any excessive capitalization on the basis of such value." Although not so stated in the report, it may be assumed that the commission believes the converse is equally true and recommends an increase in the capitalization if such is necessary to make the capitalization equal the value of the property.

The report of the Chamber of Commerce committee declares in one place that the public should allow a fair return upon the value of the property used in rendering the service but should not be asked to pay more, but this report does not make any recommendations as to capitalization.

The second clause in the federal report to which criticism has been particularly directed is XVIII, which says that cost-of-service contracts are in an experimental stage, but where they have been tried they seem to have secured a fair return upon capital, established credit and effected reasonably satisfactory public service. It adds that such contracts may safely be entered into where the public right eventually to acquire the property is safeguarded. As this indorsement is quite tentative objections to Clause XV are rather more important.

Mr. Cobb, under the title "A Car Rider's Reply," discusses Clause XV directly and presents a point of view which undoubtedly is widely held. Briefly, he declares that if the railway does not earn more than a fair return upon a fair valuation the public is not concerned as to how the return is divided among the different classes of securities. Moreover, he points out that in some cases at least it would be very difficult without the appointment of a receiver for a company to scale down its capitalization, and that this step would often work great hardship on many classes of security holders.

Undoubtedly this view is correct. It may be admitted that good service to the public can be given by a company even if its capitalization does not exactly correspond with the value of its property. Nevertheless this does not preclude the industry, as an industry, from accepting both of these reports as outlining bases which are desirable and toward which practice can trend in the relations of the companies and public.

To some any action approving the report may not seem necessary. Most if not all companies, they say, are now doing all that these reports enjoin, at least in essence, so why "indorse" them? Will not such approval give the impression that the reports favor the companies unduly and so prejudice the acceptance of their principles by the public?

This argument, too, has some reason, but it is believed by those who favor indorsement that the advantages of so doing far outweigh those of rejection. They show that the companies no longer consider a franchise as an opportunity for large private profit, but that their duties are of a public nature though directed by private management. This conception of the function of a utility, though common now in the industry, is not yet fully understood by the public. If indorsement of the reports at Chicago will help this idea a step forward will be gained.

Bookkeeping in Connection with Power Plant Operation

INEFFICIENCY cannot be tolerated in the power plant today, with fuel cost about 80 per cent of the total cost of operation and with the example of many a good installation producing power at 15 per cent thermal efficiency. The remedy is to operate in the light of facts disclosed by systematic testing. To be sure, tests are a nuisance. They disrupt routine operation and they require the services of expert technicians if best results are to be secured. However, if as a result of tests dollars are saved the tests contribute to the accomplishment of the object of the power plant, namely, to produce power economically.

Nearly all plant engineers perform routine tests on equipment, and many secure data necessary for maintaining a continuous heat balance. Other engineers, however, think of the test itself as the chief feature of their work, and they prefer to specialize on testing of only one type of their plant equipment. Some spend their time on combustion and boiler tests, others on prime mover tests, and still others on tests of steam traps and auxiliaries. Such a plan of power-plant testing furnishes no indication of plant efficiency. This follows because, for example, more heat may be lost through frequent cleaning and blowing down of boiler tubes than is saved by a slight gain in boiler efficiency; again, more heat may be lost by improper type or condition of auxiliaries than is saved by efficient prime movers.

To borrow an illustration from another field, the manager of a department store cannot devote his attention to the shoe department this week, the hardware department next week, the housefurnishing department the week after next, etc., and be certain that his whole store is operating well merely because the housefurnishing or some other department is operating at maximum efficiency. He knows what his store efficiency by a careful and systematic study of the day-to-day bookkeeping records of all departments and the monthly balance sheet.

Similarly, a continuous heat balance is the only logical method for maintaining maximum power plant efficiency. It serves to eliminate needless tests and to indicate when tests are necessary. Tests in themselves serve only to fix the limits in the heat balance.

A continuous heat balance involves some financial outlay and a slight change in operating routine, but the cost of weighing coal daily, measuring CO_2 and flue gas temperature, determining the B.t.u. content of fuel, metering the steam produced, etc., will be more than offset by the increased economy. Modern conditions cause a power plant engineer to keep both a daybook and a ledger if he wishes to operate efficiently, and the bookkeeping cost is not a factor to be compared with the value of exact knowledge of the operating conditions of the plant.

The Word "Justice" Causes a Shock

IT IS NOTEWORTHY, though not surprising, that a great outcry has been raised in certain circles in New York over Governor Miller's message in which he recommends "exact justice to all" in the New York transportation situation. Violent protests are being made against "8-cent fares" and what is called "robbing the people," and a newspaper campaign has been begun against the "Traction Trust," which is represented in familiar cartoonist style as a very stout individual buffeting and getting the best in other ways of a meek and diminutive man labeled "voter." Nevertheless Governor Miller's message may be read in vain for any reference to either an 8-cent charge for city transportation or even for a higher fare. He does, it is true, say that the transportation systems are headed toward disaster, and he expresses his wish to save both them and the city from selfish politicians and financiers, after an examination of the situation by a commission shall disclose the most desirable plan. Surely even his opponents should agree with him in his desire to have justice done in the matter. Why justice raises visions in their minds of an 8-cent fare may well be left to their consciences to answer.

In fact, the chief argument brought against revision of the transportation changes in New York by its opponents up to this time is that a 5-cent fare is nominated in the bond and must be continued or the city will exact its pound of flesh, whether or not its victim dies in the process. In this particular case, however, strict insistence on the terms of the bond is as bad for the city as for the company. A community of the size of New York is peculiarly dependent upon its transportation system and upon the expansion of its transportation facilities with its own growth. Hence there is every reason for a policy of getting together and mutual concession and the call for the exercise of state sovereignty in case the present city authorities fail to rise to their duty and their opportunities. The policy of dilly-dally must give way to something constructive.

Employers Can Well Encourage Thrift Campaigns

IN ONE of the recent advertising letters on thrift which Henry L. Doherty is publishing in the New York daily papers he brings out the close interest which employers ought to have in the present movement for thrift. They are concerned with it in many ways. Poverty in the community, always a drag upon its energies, would be reduced. The acquisition of property by a person, especially when earned by him, helps toward self-respect and regard for the property rights of others, and the added credit of the nation gained through thrift stimulates industrial enterprises and helps for prosperity.

It is needless to say that electric railway companies which are seekers after credit to develop their properties would gain greatly by a nation-wide campaign for thrift. Their men also are in a good position in many ways to join thrift movements because of the continuity of their work, which is not subject to the periods of non-employment common in other industries. This regularity of work does away with the demoralization in saving plans occasioned by periods of high income alternated by periods of no income, so that railway men should be able more easily to live according to a budget, which is a great help in saving campaigns.

It may be that some will say that the earnings of an electric railway employee are inadequate to permit him to join a thrift club, but this is not so. Every one who is at steady work can save something, except under unusual circumstances, and even if this was not the case with all railway operators those with few family responsibilities can save something if the same wages are adequate for another to support a large family. Moreover, it is being done. On the Philadelphia Rapid Transit system, for instance, the annual subscriptions of the employees to their thrift fund now amounts to more than $1,000,000.

The point cannot be too strongly stressed, however, that the advantages which will come by such a movement to electric railways and other enterprises requiring an influx of capital are not dependent upon the investment by thrift organizations in securities of such companies. Some of the capital will undoubtedly go into good utility securities, but if it was all invested in government bonds, there would still be great benefit to the railways. In fact, we see certain objections to the investment by a thrift society made up of employees of a company in the securities of that company unless possibly in bonds of a thoroughly fundamental character. Otherwise, it is a good deal like putting all of one's eggs in one basket. But it is obvious that the tendency, and a desirable tendency, will be for much of these thrift savings to go into the underlying securities of enterprises of a productive character. This will help to develop the country and provide employment for many.

Quotation from the Federal Electric Railways Commission Report

No. 6

THERE can be no satisfactory solution of the electric railway problem which does not include the fair valuation of the property employed in the public service, and where that is done the companies should voluntarily reduce any excessive capitalization to the basis of such value.

Your commission believes that excessive payments to the underlying companies by the operating company have greatly diminished the net operating revenue and that there can be no satisfactory solution of the street railway problem in such communities until the system has been valued as a whole and the accounts so kept that the public may know that the rate of fare paid yields no more than fair return upon the value of such property.

How Indiana's Commission Works

In the Hoosier State the Commission Is Proud of Its Record—Receiverships Have Been Avoided, Low Car Fares Have Been Maintained and an Optimistic Outlook for the Future Has Been Established—The Progressive Policies of the Commission Have Been an Important Element in the Situation

IN A RECENT address before the convention of the National Municipal League at Indianapolis E. I. Lewis, chairman of the Indiana Public Service Commission, referring to commission control of utilities, made the following significant statement:

> In behalf of such operation and control, adopted in this state, I would point to the fact that only one of the present 118 electric railway receiverships in the country is in Indiana and that receivership antedates the war disturbances and will be closed this year; that only six of the 600 cities having more than 5-cent fare are in this state, and that the street railways in Indiana emerge from the trying ordeals of the post-war period solvent and hopeful. In more than 1,400 utilities of all kinds in the state there are not to exceed a half dozen receiverships, and the commission points with considerable pride to the fact that they have not resulted from the confusions and disturbances incident to and following in the trail of war. While no utilities have been going into receiverships, the commission during the war period has brought a number out and established them on sound bases for future usefulness as agencies of service and as corporations offering secure investment.

MEMBERS OF THE PUBLIC SERVICE COMMISSION OF INDIANA

Seated, E. I. Lewis, chairman. Standing, left to right, Commissioners Fred Bates Johnson, John W. McCardle, Paul P. Haynes, Glenn A. Van Auken and Secretary Carl H. Mote (resigned)

The Indiana Public Service Commission was established by legislative enactment in 1913, the new organization superseding the original Railroad Commission of 1905. This legislative act is patterned very closely after that of the State of Wisconsin. It was not until the establishment of the present personnel, however, in May, 1917, with E. I. Lewis of Indianapolis as chairman, that the new progressive policies in utility regulation were inaugurated. While Mr. Lewis as chairman has had the leadership, the progressive cast of the commission has been sustained throughout the entire membership. The other commissioners are John W. McCardle of Indianapolis, Paul P. Haynes of Anderson, Glenn Van Auken of Auburn and Fred B. Johnson of Indianapolis. Carl Mote, who has been secretary of the commission since May 1, 1917, has just recently resigned.

Six distinct departments comprise the organization of the Indiana Public Service Commission, each directed as follows: (1) H. O. Garman, chief engineer; (2) Harry Boggs, chief accountant; (3) A. B. Cronk, chief of the traffic department; (4) D. E. Matthews, chief railroad inspector; (5) R. D. Armstrong, librarian; and (6) M. D. Atwater, director of service.

The charts on page 256 indicate very forcefully the burden of cases taken over by the present administration and the expediency with which both old and new cases have been dispatched. Over two hundred more cases have been disposed of in 1920 than in the previous year, the work of the commission, of course, having been unusually heavy, due to the abnormal rise in prices of materials and wages and resulting operating cost. The Indiana commission, during the trying war and post-war days, has concerned itself with maximum revenues instead of maximum rates. It has insisted that the lowest rates will often produce the most revenues, with the result that rates in Indiana probably show lower levels than in most states, while receiverships also are lower and the utilities in sounder and more optimistic condition. From the report for the year 1919 the following quotation is significant:

> The unfavorable operating conditions of the last year are responsible for most of the rate cases before the commission. In many cases it is impossible to fix rates that will yield the revenue needed to maintain service and provide a normal return on investment, for the reason that to increase the rates beyond a certain point would have the effect of discouraging business and reducing net income, thus laying a burden on the public without achieving the purpose of the increase. No public utility can operate successfully on inadequate rates. The inevitable result is poor quality of service, inability to make needed extensions to assist in developing the community, and in extreme cases discontinuance of service and junking of plants needed by the public. The commission has found little disposition on the part of the public to deny the utilities revenue needed for these purposes. It has gone on the assumption that its prime duty during the emergency is to keep necessary public utilities in operation, with as good quality of service and as liberal extension of service as can be secured.

The conditions for the year 1920 have not been materially different, the same quotation being referred to in the 1920 report as representative of that year as well. The coming year is considered to be one, however, in which promises of substantial relief may be extended for lower prices to consumers, better returns to utilities and fewer abnormal readjustments necessary on the part of commissions.

In spite of the high costs of materials and labor additions to utility plants have been made during the past year under the general supervision of the commission valued at $13,189,530. These are distributed as indicated in the table shown below.

From this table it will be noted that the interurban and street railways of Indiana have been able to do their portion of the total construction work actually accomplished. The commission estimates, however, that public interest demands that the expenditures indicated in the table be made to serve adequately the public needs for the next two years. These are exclusive of the needs of the steam railroads.

M. D. ATWATER,
director of service, provides photographic exhibits for hearings

The plan, rather unique in Indiana, which has enabled this commission to consider and settle satisfactorily so many cases in a given time has been to appoint for the responsible heads of the various departments experienced men capable of hearing minor cases themselves and either effecting a compromise agreement among the parties at the hearing or reporting back a proposed finding for consideration and formal approval by at least three members of the commission.

Generally speaking, the formal presentation of a case by counsel and the hearing of lengthy expert testimony, except in very important cases, have been discouraged. Officers of the smaller companies and complainants, possibly accompanied by engineers to advise their clients upon technical problems, have been encouraged to present informally their cases, often without legal counsel, before the chief engineer, director of service, or examiners of the commission. One typical case, involving rather serious interference between light and power transmission lines and rural telephone service, was amicably settled in a hearing of about two hours' duration before the chief engineer, the parties involved having been advised by two different members of the instructional staff of the School of Electrical Engineering of Purdue University. A formal dismissal of the case written by the commission closed the issue.

This important department of the commission has been directed by H. O. Garman throughout the entire period the public service act has been in force, during which time both political parties have been in office. The staff is made up of experienced investigators, mostly graduates of Purdue and Indiana Universities.

RECENT AND DESIRABLE UTILITY EXPENDITURES

	Expended in 1920	Desirable for Next Two Years
Municipal electric	$370,000	$15,000,000
Electric	4,747,100	....
Electric interurban railways	1,191,000	32,700,000
Electric street railways	2,527,500	17,000,000
Gas	71,000	8,000,000
Hot water heating	....	....
Steam railroads	1,635,000	
Telephone	1,499,055	12,000,000
Water	1,148,875	3,000,000
	$13,189,530	$87,700,000

During the past year alone this department has appraised property values equal to 30 per cent of the entire valuations made since the commission was organized in 1913. That the electric railways have had sufficient consideration in this matter is indicated by the valuations of the table given below.

The difficulties accompanying an equitable appraisal during the period of widely fluctuating unit costs are well illustrated by the recent statement of Mr. Garman to the effect that:

H. O. GARMAN
has been chief engineer since the commission was organized in 1913

> All the utilities of the city of Indianapolis could be appraised at any figure from $50,000,000 to $120,000,000, depending upon the point of view of the body making the appraisement. At present the general policy is to use twenty-year average price on steel rails, fifteen-year average price on copper wire and ten-year average price on cedar poles, because the one-year averages are entirely out of proportion to the actual costs.
>
> Plant equipment, such as engines, boilers, pumps, generators, switchboards, etc., is priced after the making of a study of the actual original cost new as indicated by the contracts and specifications, when available, the cost of similar equipment purchased about the same time, and the present-day cost of similar equipment. A figure is finally applied which is considered ample to reproduce each piece of equipment under the approximate circumstances and conditions obtaining during the time these prices of equipment were purchased and installed.

The question of the proper appraisal of pavement, which is often the subject of controversy in rate cases, has been standardized by the engineering department.

> In no case do we allow cost of cutting pavement when the pavement was put down subsequent to the laying of the mains and services. We endeavor to determine in each case the amount and kind of paving actually cut and upon these items put a price which is substantially a five-year average cost. All pavement cut to repair mains and services should be paid for out of the maintenance fund and is an operating expense and not a capital charge, and is therefore excluded from the appraisal.

An amount in general equal to 12 per cent of the total of all items of the appraisal exclusive of material and supplies is used as a tentative figure known as "structural overhead expense."

> If the evidence shows that this cost was paid out of operating expenses by the company we suggest that it be eliminated, and if the evidence shows beyond a shadow of a doubt that more than this much was spent and that it has not been included in any of the unit prices then this percentage should be increased. The item of structural overhead cost should include such costs as engineering, superintendence, interest during construction, taxes during construction, fire and liability insurance, small omissions of inventory, contingencies, etc.

APPRAISALS BY ENGINEERING DEPARTMENT

	May 1, 1913, to Sept. 30, 1919	Oct. 1, 1919, to Sept. 30, 1920	Total
Electric	$33,787,233	$9,445,769	$43,233,002
Electric railways	43,572,015	10,626,248	54,198,263
Gas	25,709,154	12,031,135	37,740,289
Heat	4,362,012	722,103	5,084,115
Telephone	20,033,242	22,111,917	42,145,609
Water	18,727,097	6,951,167	25,678,264
	$146,190,753	$61,888,339	$208,079,542

POLE MOVED AND EXTRA POLE SET IN SPAN AT EXPENSE OF PROPERTY OWNER TO IMPROVE ENTRANCE TO GASOLINE SERVICE STATION

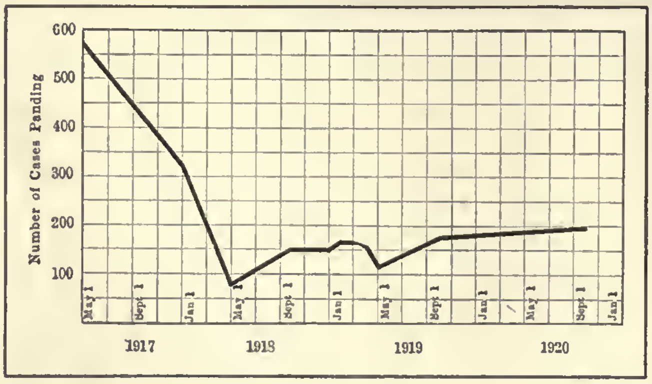
The Indiana commission endeavors to determine an equitable "fair value" of appraised property after the engineering department has submitted in its report all of the available evidence usually associated with "original cost" and "present value." To arrive at such a value under present conditions is a difficult problem.

> The commission is of the opinion that until sufficient time has elapsed to demonstrate conclusively that a new and fairly permanent higher price level has been reached normal cost of reproduction should be determined by costs prevailing immediately before the European war, with a consideration, perhaps, of what may reasonably be calculated to be a natural trend of prices had the war and other abnormal conditions not occurred.

In its consideration of "going value," a term always interpreted with difficulty, the commission seriously attacks one common method of predetermination of such a value amounting to $4,592,367, which was rejected in a decision in the Central Union Telephone Company case.

> The commission cannot accept petitioner's claim for going value nor can it approve the methods by which petitioner calculates his claim. To this commission it appears utterly unreasonable to base an allowance for going value upon the imaginary cost of presently reproducing or re-establishing a business which, under the wildest flight of fancy, never will be completely reproduced or re-established.

A rather unusual policy has been adopted by the engineering department with regard to meter testing and standardization. Practically no such calibration is done by the department itself. In fact, no standards are maintained by the department except for purposes of illustration of those which the utilities are required to install. The entire responsibility in matters of standards of service is placed upon the utility and the municipalities, such matters coming to the commission only on appeal. In the few appealed cases which come up the test is usually made on the consumers' premises under the observation of a representative of the engineering department of the commission. In many instances utilities are requested to send their standards to the State university or to commercial testing laboratories for calibration. The commission charges no fees for tests.



EFFICIENCY OF PRESENT ORGANIZATION IS INDICATED BY REDUCTION IN CASES PENDING

The librarian of this commission not only performs the usual functions of such an office but holds hearings in the rôle of examiner for the commission and reports to the commission upon many special problems. Among such 1920 reports which will be found on file in the library should be noted the following, of particular interest to electric railway executives:

1. Power of commission to compel priority in coal car distribution to mines supplying public utilities.

2. Whether in approving a purchase and sale the commission must find that the consideration represents the value of the property.

3. Power of the commission to order a depreciation reserve to be set aside *in cash.*

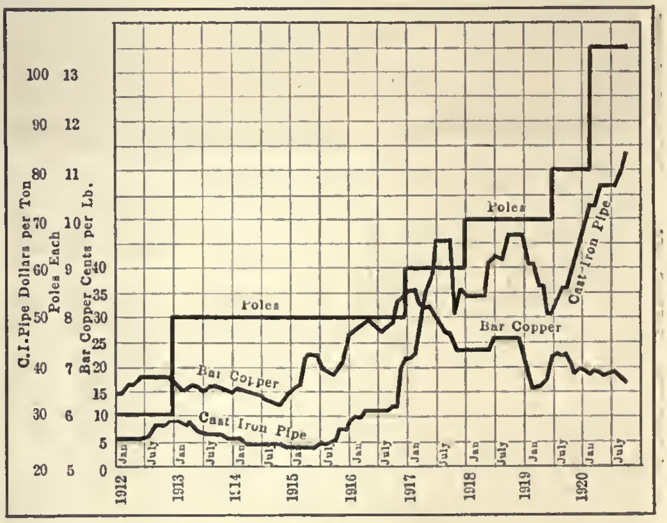
4. Power of the commission to authorize the issuance of securities to represent the surplus of a public utility.

5. The necessity and legality of a municipal election to approve purchase of property by the municipality from a public utility whose stock is owned by the municipality.

6. Power of city in connection with the obstruction by trains of crossings of city streets and railroads.

7. Power of commission to order spur tracks for shipper to build across land of another owner.

8. Power of commission to order steam railroads to tender cars to traction company at junction of steam railroad and switch tracks of traction company for transportation to shipper on switch track.



UNIT COST VARIATIONS MAKE EQUITABLE APPRAISALS DIFFICULT

9. Power of municipalities to lease their public utilities to private corporations.

10. Power of commission to order a stock dividend.

ACTIVITIES OF THE SERVICE DEPARTMENT

M. D. Atwater, director of service, has made greater use of photographs of service conditions throughout the state than is usually the case with other commissions. Enlarged photographs of accidents and bad construction have provided valuable evidence in hearings before the commission.

During the past year the following record has been made by this department:

Informal complaints closed	23
Cases adjusted	365
Plants inspected	120
Photographs taken for record	544

During the period of governmental control of the railroads it was not required by the commission that tariffs be filed as a matter of record by the railroads. Many such were furnished voluntarily, however, and since the return of the railroads to private control the back records have been completed in the files of the commission. Now no new tariffs may be put into effect without the approval of the commission.

PHOTOGRAPH EXHIBIT OF INTERURBAN WRECK DUE TO DEFERRED MAINTENANCE ON SPECIAL TRACKWORK. FORMING PART OF FILES OF COMMISSION

In general the increase of intrastate rates established by the Indiana commission are slightly less than the interstate rates founded by the Interstate Commerce Commission. It is believed by the Indiana commission that if it should increase intrastate rates to the extent of interstate values prayed for the discrimination in competitive territory vital to Indiana commercial interests would be increased over that which was pronounced unjust by the Railroad Administration under advice by the Interstate Commerce Commission. The Indiana commission believes that the intent of Congress in the transportation law was not to create a rate which would be discriminatory between states. Nor is it deemed likely that the transportation act meant to maintain exactly the same intrastate and interstate rates in a given district.

Electric interurban rates generally have been increased to the level of the steam railroads. Both steam and electric railroad systems have been heavily taxed to build highways at ever increasing expense. In the case of the interurban railroads, at least, the increasing freight business, which has been consistently developed, and a "policy of elimination of watered stock" adopted by the commission have contributed materially to save the situation from chaos.

Relative Importance of Street Railway Fares

The seriousness of the problem of street and interurban railway fares is pointed out by Mr. Lewis in the address previously quoted. After noting the care and attention given by the Interstate Commerce Commission and by Congress to the adequate solution of the steam railroad rate schedule he emphasizes the fact that while the steam railroads transport approximately one billion persons annually the street railways transport fourteen or fifteen persons to every one carried by the steam roads.

Speaking of the Indianapolis conditions Mr. Lewis said:

> While the discovery of a place where one can actually buy 18 miles of riding for 5 cents is notable, it is not as remarkable as the discovery that the company is solvent and full of hope. Returning confidence in its future is indicated by higher bid prices for its securities. On July 1, 1920, there were 118 companies, with a total of 7,820 miles of track, in receivership. Since July 1 there have been a number of receiverships added to this depressing total. Other companies, some of which have exhausted possibilities of 8 and 10-cent fares, are showing hopeless tendencies. Fifty-six of those 118 receiverships occurred between June 1, 1919, and July 1, 1920. Obviously the departure from the 5-cent fare has not been a complete success. What can be more remarkable than the experience of a public utility commission having gentlemen who two years ago sat on the front steps bemoaning the denial of a 6-cent fare petition coming around and saying, "We need some temporary relief to get us past the exorbitant coal price era, but *we want to hold fast to this five-cent fare.*"

HIGH-VOLTAGE FEEDER OF MUNICIPAL LIGHTING COMPANY PASSES OVER CABLE BOX SEAT OF TELEPHONE COMPANY WITH CLEARANCE OF ONLY 6 IN.

Five symptoms of the disease were diagnosed as follows:

1. The company was not collecting its earned revenues.
2. The value of petitioners' property did not warrant its financial obligations.
3. A sinking fund for the retirement of bonds with bonds was still drawing interest as well. Payments to the sinking fund, and payment of interest on bonds held in the sinking fund, were amounting annually to almost $200,000 of money that was badly needed for property and service.
4. Local social and industrial activity was not normal, due to the war, hence traffic was abnormal.
5. A superimposed holding and operating company.

The prescriptions issued included the following:

1. Elimination of unwarranted financial obligations.
2. Elimination of a holding company, and, incidentally, the elimination of absentee landlordism.
3. Awakening to the fact that the short haul passenger is the profitable passenger.
4. Collection of earned revenues, largely by the introduction of pay-as-you-enter cars.
5. Calculating the subnormal traffic during the war and correct forecasting of increased volume of traffic after 1918.
6. A healthy spirit of co-operation.
7. An intelligent handling of the whole situation by the city.
8. Better public relations.
9. After the financial structure is recast, and the face value of securities represent, and are warranted by, values of property put to public service, those financial obligations must be protected.

It may be asked why the popular remedy known by the "service-at-cost" label was not prescribed. The possible merits of this prescription in its many varied forms were very carefully studied and analyzed by representatives of the commission, the city and the railway corporation, all enthusiastic indorsers of the newly heralded panacea for all ills. After a thorough investigation of many of the systems in operation and the formulation of a new plan which seemed to eliminate many of the objectionable features of those already adopted, the whole proposition was tabled upon the initiative of the city in favor of other remedies previously noted.* It was felt, in brief, that incentive would be lacking and that increased costs of operation would be too readily accepted with the feeling that such burdens might be passed on to the public in the form of higher fares. "Service at cost," as ordinarily defined in practice, was therefore not recommended by the commission for Indianapolis. In fact, that approximation toward service-at-cost rates involved in the coal clauses of many light and power rates as well as in railway fare decisions has been avoided by the Indiana commission except in cases where the cost of coal represents but a small portion of the total operating expense.

MANHOLE MOVED BY UTILITY AT A COST OF $2,000, AS RESULT OF STREET DEVELOPMENT FIFTEEN YEARS AFTER INSTALLATION. ILLUSTRATION OF "SUPERSEDENCE"

The Indiana commission points to the fact that in cases of commission regulation of utilities, where the commission is really unbiased and in which it makes a careful study of valuations and operating costs and establishes a rate which provides for a reasonable return upon fair valuation over and above operating cost, depreciation and taxes, it really is putting in force a service-at-cost principle without the objectionable features as ordinarily administered by the utility.

The Indiana Public Service Commission, as in the case of several other state commissions, is just at present undergoing severe attacks in the Legislature, which is now in session. The outcome is, of course, problematical. As was said by one interested party recently, "We believe we must have been very nearly correct in our decisions, for we have critics in the ranks of both utilities and consumers." However that may be, the present Indiana commission has not suffered, apparently, from participation in politics and it has established conditions in most communities which will be recognized by the careful student of public service relations to be just and equitable.

Activities of the American Engineering Standards Committee

AMONG a number of specifications submitted to the American Engineering Standards Committee for approval, in accordance with the special provision in the procedure of the committee under which important standards in existence prior to 1920 may be approved without going through the regular process followed in new work, the American Society for Testing Materials has submitted several, including the standard method for sampling coal. The National Fire Protection Association has submitted the "National Electrical Code" for approval as an "American Standard." The Bureau of Mines has suggested, among others, its "specifications for storage battery locomotives—schedule 15—as a tentative American standard."

The Standards Committee has compiled a list of engineering standards of foreign countries, which are on file at the office of the committee, 29 West Thirty-ninth Street, New York City. They can be consulted there or photostatic copies can be furnished by the committee.

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*See ELECTRIC RAILWAY JOURNAL, Nov. 13, 1920, page 1025.

This Is the Second of a Series of Articles on the Report of the Federal Electric Railways Commission, Written by a Commissioner

Will the Electric Railway Industry Respond to the Vision of Its Present-Day Leaders?

A Forward-Looking Policy by Electric Railway Companies Is Essential—The Public Will Insist Upon Receiving Adequate Service at Lowest Attainable Cost, Consistent with Highest Efficiency—To Gain Public Approval the Companies Must Eradicate Conditions Which Constitute Injustice to the Public Interest

BY LOUIS B. WEHLE
Formerly General Counsel of the War Finance Corporation;
Member of Federal Electric Railways Commission

IT SEEMS to me that the most favorable sign for the electric railway industry in the United States today is that, in its struggle against financial prostration and municipal ownership, it has turned for leadership to a traction man who is generally understood to be sympathetic toward the public's principal grounds for criticism. Mr. Gadsden, the new president of the American Electric Railway Association, has done more than sympathize with public critics of the industry. He has had enough statesmanship to co-operate with those critics and to interpret them plainly to his own economic group. His work in originating and pushing the idea of a Federal Electric Railways Commission, his labors on that commission, and his more recent public activities would justify us in characterizing him—using the term in its best sense—as a real political leader.

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LOUIS B. WEHLE

"JUST AND STABLE ARRANGEMENTS WITH A FRIENDLY PUBLIC"

Why is the leadership of the electric railway industry today in its essence a political leadership? Because the electric railway industry does an economic-social business—the people's business. In the long run the people will certainly impose upon the street railways, if they continue to use them, their purpose that those railways shall be run at the lowest attainable cost consistent with the best service to the city's social needs and consistent with the highest efficiency. That purpose they will impose through law. The man who is today guiding the policies of the electric railway industry is dealing with the thought of the public, has in mind necessarily the laws which can be framed by it to regulate his industry, and is, therefore, in a very certain sense a political leader. To borrow a phrase from the Federal Electric Railways Commission's report, Mr. Gadsden and his associates are concerned today by economic adjustments, essentially political, with improving the financial credit of the electric railways of the country *"through just and stable arrangements with a friendly public."*

The arrangements with the public must be just and they must be stable if the financial credit of the electric railway industry is now to be strengthened with any permanency. The winning of higher fares does not in itself furnish any real solution to the industry's long-range problem, because high fares cannot prevent—rather do they tend to stimulate—local public agitation which might quickly impair or destroy a company's credit. Nor does the introduction here and there of varying plans bearing the "service-at-cost" label solve the difficulties. The leaders within the industry itself, and within the separate traction systems all over the country, should quickly eliminate, wherever they exist, those deeply rooted evils which today remain as irritants to public opinion. It is not enough that those evils, frequently due to public as well as to private neglects in the past, will in due time under present or future laws be abolished by public service commissions. If the industry is really to be saved to its owners, they must, it seems to me, follow those few leaders in the industry who are courageously advocating a drastic housecleaning. Arrangements which are just will necessarily be stable because they will create a permanently friendly public, immune from the demagogue, upon whose laws and mental attitude long-term financial arrangements can with confidence be carried through under private ownership and management.

HOW CERTAIN LEADERS IN THE INDUSTRY WOULD CREATE A FRIENDLY PUBLIC

The question is whether the leadership of men like Mr. Gadsden and General Guy Tripp in the electric railway and allied industries is going to be seriously followed by the industry. These men see into the future. I think they see the heavy drift toward municipalization, and realize that real reforms within the industry, promptly and spontaneously made, can alone save it from engulfment in the experiment of public ownership, an engulfment in which the large and the small stockholders and bondholders, the owners of the property, may fare none too well at the hands of a public perhaps half informed or strongly prejudiced, and itself thus not capable of entire fairness.

In his testimony before the commission, at a time when prices were still moving up grade, General Tripp said in effect that the valuation of street railways for rate-making purposes should be made upon the basis of actual money which has gone into the property itself.

In the unanimous report of the commission, Mr. Gadsden and Mr. Beall, the latter a member of one of the largest investment banking firms concerned with traction investment, joined in expounding the seven following points, among others:

1. That "holding companies in many instances have been responsible for overcapitalization and have insisted upon drawing from the underlying companies every possible cent that could be secured, in order to make a showing on these inflated securities."

2. In many cities consolidations have resulted in underlying companies receiving guaranteed fixed returns which are excessive and "have greatly diminished the net operating revenue, and that there can be no satisfactory solution of the street railway problem in such communities until the system has been valued as a whole and the accounts so kept that the public may know that the rate of fare paid yields no more than a fair return on the value of such property."

3. The finding of the fair value of the property for rate-making purposes is a prerequisite for the permanent solution of the electric railway question. "The rapid increase in the cost of labor, supplies and material during and subsequent to the war period seems to have served as a peculiarly vivid indication that the original cost is a primary factor in finding value for rate-making purposes."

4. "The valuation, when once fixed as the basis for the financial return of the company, should logically come to affect the amount of capitalization. No matter what may be the plan of operation or of public regulation under which the company is working, if its financial credit is to be strengthened through just and stable arrangements with a friendly public, it should, in the judgment of this commission, voluntarily reduce any excessive capitalization to conform to such valuation as may have been determined upon."

5. "The electric railways should adopt the policy of setting aside a depreciation fund with which to take care of replacements and thus preserve the integrity of their investment. It would have a very wholesome effect upon credit. Such has not been the practice in the past."

6. Such rentals and power rates as would on investigation prove excessive should be reduced.

7. Serious co-operation should be effected in the protection and in the preservation of all corporate, financial and cost records with a view to their being available in connection with a fair valuation of the property. Without these data the public will tend to be suspicious of any appraisal which might be made, and "the failure of a company to preserve its records may in the end hurt its stockholders more than it may the public."

SELF-DECEPTION AND MUNICIPAL OWNERSHIP

The ELECTRIC RAILWAY JOURNAL circulates mostly in the electric railway family. The family is a place where there is generally plain talking, and I hope I may be pardoned if I do some plain talking here. In all candor, I ask whether the owners of the industry will now uphold these present public leaders of theirs and will now undertake seriously to follow the suggestions in the commission's report which have just been reviewed, or whether, by selective emphasis upon the features of that report which are more palatable, they will follow the illusory route of least resistance, the path of self-deception. Where is the sustained publicity within the industry for the ideas of voluntary reduction of excess capitalization, for valuation with original cost as a primary factor, or for reduction of excessive rail or power rentals? Where are the companies that are voluntarily undertaking to carry those ideas into effect?

Because of dangers incident to public ownership and management of street railways, I believe in trying to maintain them under private ownership and management, if private ownership and public service can be made compatible. Most of our city governments have failed so seriously and so often in smaller problems that it would be, indeed, optimistic to trust their average ability to succeed today with this formidable one. The experiment of private ownership must be given some further trial before I should be willing to see our American cities risk the dangers of political demoralization and of public inefficiency involved in public ownership and operation by their governments, as generally at present constituted; but if municipal ownership were to sweep the country tomorrow as a political epidemic, I should not be so concerned for the future of municipal government or of public urban transportation as I should be concerned by the reflection that a naturally indulgent American public has been forced to take away from this great American industry the ownership and operation of its own properties because its managers have been unable to handle its problems with sufficient fairness and ability to be allowed to hold them.

If those reforms which have been summarized above from the report of the Federal Electric Railways Commission should be applied spontaneously and persistently under the leadership of such men as seem now to be the public spokesmen of the electric railway industry, we may attain such a balance between private claim and public right as will prolong the life of the industry under private management. But if the public should, after such an effort at adjustment by the managements, still fail to receive adequate service at the lowest obtainable cost consistent with high efficiency, then municipal ownership would be the next logical step; and, if it comes at such a time, it would probably be effected with far less incidental injustice to the owners of the industry than would attend such a process of change today. Furthermore, if it comes under such conditions, it will be at least possible for us to know that it comes rather as the inevitable operation of a basic economic principle at work in connection with all public service than as a result of the inability of Americans to adjust their financial differences by dealing fairly with one another.

Summarizing the situation, I should say: Increases in fare have in many cases been, and in still other cases doubtless would be, justified. Much is to be expected from an honest and able administration of a well devised service-at-cost plan, if one can be evolved which will really insure efficiency. There are cities in which extensions of rapid transit and subway can be paid for, either wholly or in part, out of special assessments upon enhanced property values, so that the carfares can remain low and so allow the cities to avoid congestion, while at the same time securing justice to the old investors in the property. In many cities the companies are unfairly burdened with obligations to pave and maintain streets and way-bearing structures—burdens which go beyond what should be called for by the companies' proportionate use of the highways; and these injustices should be removed.

Furthermore, to the extent that the railway properties through comprehensive regulation and control come in the future to be public instrumentalities, instead of free means of private profit, they should be correspondingly relieved from property and franchise taxation until their contribution in taxes comes to be only enough to reimburse the city for its actual costs primarily referable to the presence of the street railway.

But these forms of relief for the companies and these changes in the technique of management or of regulation, approved in the commission's report, should, as was implied by the commission, not be attained, nor would their attainment permanently establish the credit of the industry as private enterprise, unless the managements in the industry will eradicate from it such conditions, where they exist, as now constitute injustice to the public interest, and will insure the public against future injustice.

It is a splendid challenge to American ability.

Transit Representatives Meet

The Association of Public Representatives of Urban Transit Hold a Conference at Cleveland at Which Various Topics Connected with Transportation Are Discussed, Particularly the Working Out of Service-at-Cost Contracts

AT THE call of President Culkins, the Public Representatives of Urban Transit met at the Hollenden House, Cleveland, on Tuesday, Jan. 25, to discuss intimately the problems that affect them—more particularly those that are arising in the working out of service-at-cost contracts. The meeting proved so interesting that the delegates were unable to accept the invitation of the Cleveland Railway to go over parts of its property. Those in attendance were the following: W. C. Culkins, Cincinnati; Charles R. Barnes, Rochester; Colonel J. L. Wickes, Baltimore; W. L. Sause, Youngstown; Judge Fielder Sanders, Cleveland—all of whom represent the cities named as street railway commissioners or directors; R. F. Kelker, Jr., Board of Supervising Engineers, Chicago Traction; Arthur F. Blaser, chief engineer to Judge Sanders; J. W. Leadley, manager Cleveland office Parsons, Klapp, Brinckerhoff & Douglas; Walter Jackson, Mount Vernon, N. Y., and a generous delegation from the Cleveland Railway, including J. J. Stanley, president, who acted as luncheon host; H. J. Davies, secretary and treasurer; Charles H. Clark, engineer maintenance-of-way, and Paul E. Wilson, assistant to the president. The presence of the Cleveland Railway men was particularly welcome because of their experiences with and viewpoint of service at cost based upon ten years of operation under the Tayler agreement.

THE RECENT FALL IN TRAFFIC OPERATING EXPENSES

The first subject taken up was that of recent reductions in riding and what means could be adopted to offset same, either in cutting costs or promoting voluntary traffic. Colonel Wickes noted that during the past month Baltimore travel had fallen 60,000 a day, chiefly in the movement to and from factories. Judge Sanders stated that Cleveland had already begun to cut off mileage on factory routes. Studies were also under way to do the same on residential lines. About two weeks were required to work up new schedules. At the end of 1920 daily car-miles were about 7.5 per cent in excess of the preceding year, but by Feb. 15 the standards of 1919 will be in force again. As to wages, there had already been a cut of 10 per cent in the case of the trackmen and shopmen, who are unorganized. The unionized platform men, however, have a contract good to May 1 unless they choose to accept a lower rate—possibly a reduction of 20 per cent. At luncheon Mr. Stanley said that Cleveland had begun by cutting the salaries of the general officers first.

Discussing Rochester traffic, Mr. Barnes reported that although factory travel had dropped as the result of a thirty-day to sixty-day shutdown, the shopping and pleasure traffic had not yet suffered in the same degree. Mr. Sause added that Youngstown had reached the point of cutting out trippers.

There followed a general discussion of operating and total costs, including accident expenses. Mr. Culkins mentioned the remarkably low figure of Cincinnati, approximately 2 per cent of revenue during recent months, compared with about 8 per cent in Cleveland. Mr. Kelker pointed out the value of co-operating with the National Safety Council.

THROUGH ROUTES OR TURNBACKS

There was a divergence of opinion on the age-old subject of turning back from or going through the congested delivery districts. Some held the opinion that the cars should be turned back outside the district and let the passengers walk several blocks if necessary. Others held that through service, particularly where the loads on opposite sides balance, was preferable. Nevertheless, two firm deductions could be drawn from this discussion:

First, the longer the through line the greater the distortion of headways and consequent impairment of service and waste of mileage.

Second, the lack of flexibility of single-end cars when turnback points have to be changed and there is an absence of sufficient loops.

PAY-LEAVE AND STREET COLLECTORS SPEED LOADING

Mr. Culkins said that partial pay-leave operation at Cincinnati had greatly relieved congestion even though the company had not taken advantage of this innovation to secure higher schedule speeds. Judge Sanders noted that in Cleveland the short riders had gradually acquired the habit of getting up to the farebox quickly instead of mauling their way through the whole length of the car when they wanted to get off. At one factory a man was stationed to sell the 1-cent transfers on the prepayment plan, thus speeding up pay-leave operation.

PERCENTAGE OF TICKETS SOLD—ONE FARE BEGINNINGS

With the present 6-cent cash and nine for 50-cents ticket fare 67 per cent of Cleveland fares are tickets. The highest Cleveland percentage, 92 per cent, was in the 3-cent days when tickets were sold five for 15 cents and the cash fare was either three pennies or 5 cents straight. Mr. Culkins reported that with 9-cent cash and 8½-cent tickets two to a strip the Cincinnati percentage was now 86 to 87 per cent; with 7-cent and 7½-cent fares it had been about 70 per cent. Rochester's four-strip ticket, said Mr. Barnes, covered 62 per cent of the rides. As for Chicago, the ticket percentage was negligible, said Mr. Kelker, although the cash fare on the surface lines is 7 cents while tickets are sold for 6.5 cents on the basis of ten for 65 cents and for 6 cents on the basis of fifty for $3. There seemed to be a fear of losing tickets which kept the public from buying them, and very few bought tickets in lots of $3.

Colonel Wickes brought up the question of what to do with annexed communities which lay claim to the prevailing flat fare. Judge Sanders observed that in Cleveland a beginning had been made in making the longer riders pay for the additional service. Southeast Cleveland was paying 8 cents and in the south end the fare was 5 plus 6 cents. Mr. Sause said that the village of Poland was now paying 5 cents in addition to the 9-cent fare in Youngstown itself. Not long ago, with the 8-cent fare in force, the Polanders were getting 8 miles, but they realized the injustice of paying no more than the people of Youngstown, whose ride was on the order of 3 miles.

SHOULD FARES BEGIN TO GO DOWN?

The need of electric railways for more revenue in contrast with the falling purchasing power of the street car user was naturally a matter of lively discussion. Mr. Stanley was most outspoken in his statement that he did not want to see the Cleveland fare go beyond 6 cents, although the balancing fund was rapidly diminishing. As the wages of the public were being cut it was essential that street railway men's wages would have to be cut too so that fares could be kept down instead of being forced up.

Mr. Stanley figured that the Cleveland system was carrying one and one-fourth times the population daily and that the average length of ride was 2.38 miles. Mr. Barnes placed Rochester's riding habit at practically unity.

ONE-WAY VERSUS TWO-WAY STREETS; NO PARKING

Colonel Wickes stated that because of the traffic saturation of certain Baltimore streets he had suggested to the railway that some streets be turned into one-way traffic for all vehicles, with one track reserved for local cars and the other for through cars. He had calculated that the express cars would attain 30 to 40 per cent greater speeds.

Mr. Kelker mentioned that Chicago was seriously considering an ordinance which would prohibit parking in an area of 1¼ x ⅝ miles. He had proposed the segregation of certain streets for vehicular traffic and of others for car traffic. Mr. Culkins brought up the desirability of sometimes giving up one track on one-way streets.

In Cleveland, said Judge Sanders, automobile parking on the loading side of Euclid Avenue—the great east-west thoroughfare—had been abolished up to Twenty-second Street during the rush hours. Because of the peculiarities of the street layout downtown automobilists would find one-way streets extremely annoying. For this reason the Cleveland Automobile Club opposed the idea. The club had made an elaborate study of traffic conditions in other cities, which study was available on application.

As regards the number of people served where automobiles are most plentiful, it appears that in both Chicago and Baltimore the average number of occupants per machine was only two. Therefore, there could be no question about their wasteful use of street space, whether running or parked.

SERVICE-AT-COST AND REVENUE EXPERIENCES

From the intimate and highly valuable discussion which followed as to results with service-at-cost franchises it was obvious, as Mr. Culkins said, that the spirit of co-operation was more important than the letter of the contracts. In discussing fare increases made under the Cincinnati plan he said that every one-half-cent increase was supposed to bring $55,000 a month more, but actually the increase averaged but $18,000. The first fifteen days of January, 1921, excluding Jan. 1, compared with the first fifteen days of October, excluding Oct. 1, showed $200 a day less with 9-cent cash and 8.5-cent tickets than with 8 cents cash flat.

Cincinnati's allowance for administering service at cost is $17,000 per annum, and this comes out of the city's treasury. Rochester's $30,000 is an operating charge. Cleveland's $60,000 is also charged against the railway, but part of this covers checking services which the railway would require in any event.

It was Mr. Sause's experience that the operating allowance per car-mile was one of the most troublesome features of existing service-at-cost contracts. Too often expediency had to govern in seeking alterations in allowances for a matter that actually cannot be calculated far ahead. Mr. Culkins believed that the budget systems of Boston and Cincinnati were an improvement in this respect. Mr. Barnes urged that greater stress be placed upon relieving the railways from city taxes, where feasible, in preference to increasing the fare.

A most instructive feature of the meeting was Mr. Davies' analysis of the forthcoming annual report of the Cleveland Railway, which embodies a review of ten years of the Tayler plan of service at cost. His analysis and answers to the questions raised were much appreciated.

On the lines of the Interborough Rapid Transit Company there are eight stations built on curves, so that there is a space between the car platform and the station platform. From 1911 to 1919, inclusive, there have been 5,559 claims for accidents due to the existence of this space, and in the settlement of these claims the Interborough Rapid Transit Company has paid $560,271.

Canadian Railway Men Meet at Ottawa

At Rousing Convention of Canadian Electric Railway Association Safety, Traffic Regulation, Safety Cars and Service at Cost Were Discussed— G. Gordon Gale of Hull Was Elected President

CIVIC CENTER OF OTTAWA, WITH PARLIAMENT BUILDINGS AND POST OFFICE AT LEFT, UNION STATION AT RIGHT, CONVENTION HEADQUARTERS AT RIGHT CENTER

THE seventeenth annual convention of the Canadian Electric Railway Association was held at the Château Laurier, Ottawa, Ont., on Jan. 31 and Feb. 1. The attendance was more than 100. Arthur Gaboury, president of the association, presided, assisted by G. Gordon Gale, vice-president. The opening address was one of welcome by Hon. Frank Plant, Mayor of Ottawa. He described some of the features characterizing the city as the capital of the Dominion and referred humorously to its desire for municipalization of the street railways as a sign of progressiveness, or, in the minds of some people, as a sign of over-progressiveness. He showed a spirit of real interest in the traction problem.

A. Eastman, Kingsville, Ont., acting honorary secretary-treasurer, read the minutes of the preceding convention, referring particularly to changes in the constitution and by-laws. After the reading of the president's address, Mr. Eastman also read his report as treasurer, showing the association to be in flourishing financial condition. He also tendered his resignation.

Presidential Address

In his presidential address Mr. Gaboury, superintendent Montreal Tramways, welcomed the delegates to the seventeenth annual convention of the association and said that for the first time in its history it had invited others than its own immediate members to attend. He was pleased, he said, to note representatives from the municipally owned railways as well as from industries closely allied with the electric railway business. He then explained that at the last annual meeting and at meetings of the executive committee it had been decided to enlarge the association to embrace all electric railways, and that it was the hope of the members to make the association second to none on the continent.

He then said that the industry during the past few years had been called upon to face the most critical test in its existence, and now is the moment when "united we stand, divided we fall" is more applicable than ever. He then referred to the papers which had been scheduled for presentation at the meeting, mentioning each individually, and gave an explanation of the reasons which led up to the preparation of his own paper, which, he said, was being presented through the courtesy of a committee of the American Electric Railway Association.

Traffic rules, he said, are above all necessary for the convenience of the traveling public and in consequence should help the quick movement of the street car and its passengers. In conclusion, he extended his thanks to the other officers and executive committee of the association for their co-operation during the year. Following the presentation of Mr. Gaboury's presidential address a nominating committee was appointed to report on Tuesday, as follows: W. J. Radford, Toronto; F. S. Livingston, Toronto; J. M. Ahearn, Ottawa; H. E. Weyman, Levis.

G. Gordon Gale then explained the changes, made and proposed, in the constitution and by-laws, caused mainly by the retirement last year of Acton Burrows from the post of honorary secretary-treasurer after fourteen years of service. There will now be an elected treasurer, a secretary to be appointed by the president and an auditor. There will, as before, be both honorary and active presidents and vice-presidents.

Mr. Gale then presented a set of "Proposed Rules for Installation and Maintenance of Electrical Supply and Signal Lines," prepared by the Hydro-Power Commission of Ontario and submitted for criticism. These were referred to a special committee to be appointed.

Mr. Eastman then read a large number of expressions of regret at inability to attend, showing improved interest in the meeting. He also reported that a number of manufacturers are joining the association, as they are privileged to do this year for the first time. These pay an annual fee of $50.

The question of providing for individual membership was also raised, there being some demand for this grade. After discussion the matter was left to the executive committee for appropriate action.

Monday Afternoon Session

In opening the afternoon session President Gaboury introduced H. H. Couzens of the Toronto Transportation Commission as a representative of the municipally owned lines. Mr. Couzens deplored the antagonism which exists between those who advocate respectively public and private ownership and operation. There should be, he said, no differences of opinion at any rate between the men who operate the properties.

D. M. Campbell, of Donald M. Campbell Company, car builders, was then called upon as a representative of the supply men. He expressed appreciation of the new relation of the supply interests to the C. E. R. A., and said that a meeting of their representatives would be held later in the day to make plans for future co-operation with the association.

A. B. Ingram of the Ontario Railway & Municipal Board then told of the work of this board, the rulings of which, he said, are not always popular. He stated further that there is a fine field ahead for the association and that the fact that the publicly owned roads are joining augurs well for the future. There must be "give and take" between the privately and publicly owned railways.

TABLE I—SHOWING FARES—MONTREAL TRAMWAYS

Period	Cash Fare (Cents)	Tickets Good 5 A.M. to Midnight	School Tickets Good 8 a m. to 6 p m.	Cash Fare After Midnight (Cents)
Feb. 9, 1918, to Oct. 3, 1918	5	6 for 25 cents 25 for $1.00 8 for 25 cents*	10 for 25 cents†	10
Oct. 3, 1918, to Oct. 26, 1919	6	5 for 25 cents 6 for 25 cents*	7 for 25 cents	15
Oct. 26, 1919, to Sept. 1, 1920	7	5 for 30 cents 44 for $2.50	7 for 25 cents	15
Sept. 1, 1920, to date	7	4 for 25 cents 50 for $3.00	7 for 25 cents	15

* These tickets were good between 5 a.m. and 8 a.m. and between 5 p.m and 7 p.m., Sunday excepted.
† These tickets were good from 5 a m to midnight, Sundays excepted.
Note: Strip tickets sold on cars. Book tickets sold only at offices of company.

MONTREAL SERVICE-AT-COST-PLAN

J. E. Hutcheson, general manager Montreal Tramways, then read a paper on the Montreal Tramways' service-at-cost contract, giving the results of two years' operation. He said in his introduction that the city of Montreal had increased in area from 9 square miles and a population of 216,000 in 1892 to 50.24 square miles and a population of 800,000 in 1917. During this time a number of small neighboring municipalities were annexed, and this brought demand for extensions and improved service from the tramways. As the city did not have a contract to call upon the company to build these extensions, negotiations were begun between the two, and in 1917 the Legislature appointed a commission of five to study the subject. This commission recommended service at cost, and a contract was made between the city and the company and became effective on Feb. 9, 1918, for a period of thirty-five years.*

TABLE II—COST OF SERVICE DURING DIFFERENT FARE PERIODS

	1st Period Feb. 10 to Sept. 30, 1918	2nd Period Oct. 1, 1918, to Oct. 31, 1919	3d Period Nov. 1, 1919, to Aug. 31, 1920	4th Period Sept. 1 to Nov. 30, 1920
Length of period (mos.)	7⅔	13	10	3
Passenger earnings	$4,771,662	$9,706,968	$9,303,154	$2,907,095
Gross earnings	4,873,931	9,892,525	9,491,085	2,988,859
Total charges	5,449,034	11,036,110	9,531,278	2,898,486
Balance	*$575,103	*$1,143,585	*$40,193	$90,373
Revenue passengers carried	116,571.723	201,919,820	159,030,043	47,741,940
Car earnings per passenger	4.09c	4.80c	5.85c	6.09c
Cost of service per passenger	4.68c	5.46c	5.99c	6.07c

* Deficit.

Since the adoption of the contract there have been three fare changes. Colonel Hutcheson then presented a series of tables from which the two that accompany this article were compiled, showing the fares charged during the four periods, passenger earnings, revenue passengers, car earnings per passenger in each period.

It will be seen that during the three months from Sept. 1 to Nov. 30 there has been a margin of revenue over expenses, although there is a considerable shortage resulting from previous operation at the lower rates of fare to be made up. It is hoped, general conditions permitting, that this shortage can be gradually made up without the necessity of any radical increase in the present rate of fare.

Supplementing the paper Colonel Hutcheson gave data showing the present distribution of the varieties of fares in Montreal. Only 3.74 per cent of the patrons pay cash; 76.21 per cent pay 6¼ cents (four tickets for a quarter); 17.7 per cent use 6-cent tickets; and 2.35 per cent use school tickets (seven for a quarter). He also exhibited diagrams showing the income and itemized expense by months over the service-at-cost period. He said also, in answer to a question, that the company is having difficulty in raising money, but that by paying much more for it than the rate allowed by the franchise the urgent requirements are being met.

The paper brought out a lively discussion in which the leading spirit was Dr. L. A. Herdt, vice-chairman Montreal Tramways Commission. He gave the point of view of the public with respect to the service-at-cost franchise, stating that the question is now public operation versus private operation under public control. He said that in Quebec there are no publicly operated railways, and traced the history of the commission, which serves as a means of co-operation between public and railway and permits the operation of the property by well-trained railway men.

Referring to Colonel Hutcheson's compilations he pointed out that in ten years the average actual fare in Montreal had increased from 4.03 to 5.62 cents, or 40 per cent; the revenue per car-mile from 29.8 to 47.1 cents, or 60 per cent, and the operating ratio from 56.2 to 75 per cent, while the net earnings for fixed charges decreased from 1.76 per car-mile to 1.4 cents, or 20 per cent. He said that under the present arrangement schedules are much more flexible than under earlier franchises, dead mileage has been cut down and schedule speed increased from 7 to 10 m.p.h.

Further the number of passengers per car-mile has been increased from seven to 8.7 per car-mile, and in January and February, 1921, the income has been 57 cents per car-mile. These results are possible because the cars are found where and when they are needed, and because there is co-operation between the railway and the commission. Conditions are met as they arise.

As to depreciation and maintenance, Dr. Herdt said that the property is maintained in good condition, which is equivalent to allowing for depreciation. In answer to a question as to the company's incentive to keep up the property, he pointed out the company owns the property, hence wants to maintain it. The operating bonus is an incentive to efficient operation because the company must keep within the operating allowance to obtain it.

The practical working out of the plan is seen in the fact that whereas the city of Montreal appealed to the Quebec Public Utilities Commission against the earlier fare increases, this was not done when the last raise was made. The city has learned to trust the Tramway Commission.

In closing the discussion, in answer to a question, Colonel Hutcheson said that the tramways employees feel that the rental paid to the city ought to go to them. He also commented upon the remarkable make-up of the Ottawa convention, comprising as it did representatives of municipal and provincial commissions, chiefs of police, supply men and other guests in addition to the railway men themselves.

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*The terms of this franchise were described in a paper read by Mr. Hutcheson at the 1919 convention of the American Railway Association (see Report Number ELECTRIC RAILWAY JOURNAL, Oct. 11, 1919, page 24).

The papers by Messrs. McCune and Weyman were then read by the authors, who illustrated them with lantern slides and motion pictures. Discussion was postponed to Tuesday.

WHY THE SAFETY CAR HAS SUCCEEDED

Mr. McCune prefaced his paper on the safety car by saying that the figures on this subject are of ample scope to enable a speaker to point out the numerous meritorious features which characterize safety-car operation and which have enabled rich financial returns to be obtained. Moreover, he can support his arguments with convincing data obtained from actual service in many cities. He defined as a "safety car" a car which is equipped with automatic laborless apparatus so interlocked that regardless of illness or distraction of the operator the power will be cut off instantaneously, the air brake and sander will be applied immediately thereafter and the doors will unlock for safe and easy exit of passengers.

Again, a car is a safety car only when the doors must be closed and the steps folded before it can start and when the air brake must be applied before the doors are opened and the step lowered in bringing the car to a service stop. This definition does not in itself specify the structural features of the car and does not preclude any car from becoming a safety car if the proper apparatus is applied. Mr. McCune said, however, that as the term "safety car" is generally used and as he used it in this paper it applies more especially to the car of the Birney type, which has been placed in service in large numbers within the past four years.

After describing briefly the general physical characteristics of the car, Mr. McCune said that at the end of 1916 there were some 400 safety cars in operation, and by the end of 1920 the number had increased to more than 3,000. This development was due to the following facts: About the time of the war the financial condition of the electric railway industry was impaired, due chiefly to the large use of the automobile, both by individuals and as a passenger-carrying bus. The situation was further complicated by the increases in cost of materials and labor. The effect was cumulative because the unprecedented increase in operating costs interfered with the securing of money for capital expenditures, thus managements were unable to make those improvements in service which would have resulted in an increase in the number of passengers carried. The situation thus resulting urgently required some relief, which was afforded in large measure by the adoption of the safety car.

Until it had been designed, the tendency in construction had been toward larger cars, the design of which was based primarily upon the necessities of rush-hour traffic. As early as 1914 it was recognized that the non-rush hour traffic constituted the larger part of the traffic of an electric railway, and that possibly an increase in net earnings would ensue if the car design applied more particularly to this class of service. Evidently the type of car especially suitable for this service is a small car of light weight. The savings possible then became immediately obvious. Moreover, it naturally followed that as the contemplated car would be small and light, it would be entirely practicable to entrust its operation to one operator, who would materially increase its earning power on account of the reduction in platform expense.

A SUMMARY OF SAFETY-CAR DATA

Mr. McCune then went on to explain the details of the air-brake and safety-car control equipment, after which he summarized the report of the safety car operation committee of the American Electric Railway Transportation & Traffic Association, presented at the October, 1920, convention. This report showed that there were in service or on order for delivery before Oct. 1, 3,750 safety cars, the total number of companies using these cars being 340. Of companies replying to a questionnaire sent out by the committee, four used safety cars in cities having a population in excess of 250,000, thirty-four used them in cities of less than 100,000 population and eleven used them in cities of from 100,000 to 250,000. The committee's report stated that in average cases of small cities or of lines in cities of any size where traffic is light or limited in amount, an average saving in operating expense could be effected by substituting safety cars, car for car, for existing two-man cars, of approximately 45 per cent in trainmen's wages, 30 per cent in maintenance of cars, 25 per cent in accident loss and 30 per cent in power cost. For the average system these savings aggregate about 20 per cent of the operating expense. No increase in gross earnings is expected in this case.

As to the rate of increase of purchases of safety cars, Mr. McCune said that in 1916 8 per cent of all city surface cars purchased were safety cars, in 1917 the figure was 20 per cent and in 1918, the last year for which he had statistics at hand, it was 40 per cent. Returning to the T. & T. Association report, he quoted the statement that in medium-sized cities, where base headways are between five and twenty minutes, it is almost universally the case that gross earnings can be materially increased by more frequent headways. For the companies reporting, an average of 40½ per cent increase was made in car frequency with safety cars, compared to former two-man cars, resulting in a reduction in gross earnings per car-mile of 0.93 per cent. The committee assumed a hypothetical case and from it derived an increase in net earnings of 7 cents per mile from a change from two-man cars to safety cars. Taking the case where there is no increase in headway, the saving per safety car per year based on 50,000 car-miles per year would be $2,500. Where the headway was increased the saving would be $4,500 per year.

In conclusion Mr. McCune said that the committee's report did not mention one feature which seemed to him of considerable importance, namely, the effect of safety cars upon capital expenditure. Where cars are purchased to give improved service by means of a reduction in headway, it is quite possible that the number of safety cars necessary will be no greater than the number of double-truck cars that would be required. In this case the expenditure will be considerably less, thus not only making it easier to purchase the cars originally but also reducing the interest charge. He then quoted from the report of the committee the following:

> In general, the committee concludes that the safety car merits the attention of the industries to a still greater extent than hitherto. Its growth in numbers in the past four years from 400 cars at the end of 1916 to 3,000 at the present time has been remarkable, and the committee feels warranted in predicting that its application will be still further expanded in the near future. Reports of its suc-

cessful operation and of its appreciation by the general public come from widely separated localities and justify the feeling that there are very few, if any, local questions affecting its adaptability. Its success, which may therefore be safely predicted, will be evidenced by lower operating costs and a lower operating ratio, more frequent service and increased satisfaction on the part of those who ride the cars.

ADAPTABILITY OF THE SAFETY CAR TO CANADIAN SEVERE WINTER CONDITIONS

A paper on the above subject was presented by H. E. Weyman, manager the Levis County Railway, Levis, Que., who said that the line is single track with turnouts or passing points, all on narrow streets and located on one side. The traffic is 20 per cent city and 80 per cent suburban, and there are three divisions, all radiating from the ferry landing, one going west to Quebec Bridge and two going east on the same line for three-quarters of a mile, then one turning south, going uptown. Before reaching this junction point there is some 300 ft. of 13½ per cent grade, with two curves on it, and the main road crossing the track twice on the grade. This being a dangerous place when cars are following one another, they have to wait about 400 ft. from the grade until the one in front has negotiated it. The uptown line rises 300 ft. in 2 miles, with average grades of 6 per cent, the maximum being 11 per cent for 1,200 ft. The system has numerous curves; some say there is but 10 per cent tangent track. In addition to this the winter conditions are the most severe to be met anywhere, including very heavy snowstorms with high winds. Continuing, he said in part:

In winter the ferry is on half-hour service and in the rush hours this throws some 400 people at us each trip. To take care of this we put on extra safeties following the regular cars, called double-headers; these turn back at about half way on each division, leaving the regular car to run to the terminus. Formerly we operated double-truck, 40,000-lb., 140-hp. cars and no extras, and these, of course, operated all day and ran to the terminus. We also had some single-truck cars on our uptown line. Naturally the double-truck cars were responsible for very heavy peaks on the power system besides heavy maintenance of track and equipment. With the safeties we have lowered our peaks and cut everything else in half incidentally providing better accommodation and service.

We probably investigated this type of car and its characteristics more thoroughly than most companies do, especially as we were told repeatedly by both Canadian and American railway operators that it could not operate under our conditions. Finally we decided to stand by the principles of engineering and ordered twelve Birney cars, specially fitted up for our climatic conditions. These cars have been in operation twenty months now and prove to be equal, if not superior, under snow conditions to the double-truck cars previously used. Moreover, we no longer haul 140 hp., 40,000-lb. cars around for twenty hours per day, filled only for five or six hours per day. The safety has remarkable tractive effort, which, together with the quick acceleration, permits the car to operate better under bad rail conditions than any other car. This was demonstrated only this month when our double-truck freight car and the sweeper had trouble with the wheels spinning, while the safeties had no trouble. Some years ago we used, more or less, to permit our cars to buck the snow, with the result that our equipment was finally burnt out. After that we decided to fight the snow with snow equipment only and soon found we were much in pocket. Naturally we do the same with the safeties, and although they have once or twice bucked the snow without trouble we do not permit it to be done if avoidable.

Our railway system is by no means an ideal one to show what the safety cars can do, but their showing on the uptown line might be of interest. From the center of uptown to the ferry is three to five minutes' walk, up or down the cliff, while it takes the cars fifteen minutes to arrive at the same point, which they do by a circuitous route. In spite of two raises in fare to 10 cents cash, and tickets 7½ cents each, and no increase in the headway, although three safeties replaced four old cars, giving a little faster schedule speed, we average 25 per cent increase in revenue passengers. When we put the safeties into operation we put in force regular inspections at 1,500 miles, special inspections at 10,000 miles, when oiling and greasing are attended to, besides other work, and a yearly overhaul of everything. We also have a special accounting system, which gives us separate figures for new and old passenger equipment, snow equipment and details of the various apparatus comprising the car equipment. During a period of twenty months we have the following figures:

	Safety Cars, Cents per Car-Mile	Old Cars, Cents per Car-Mile
Car body and truck	0.873	4.08
Electrical equipment	0.154	2.34
Air equipment	0.133	0.63
Total	1.16	7.05

The figures for the safeties include certain expenses due to defects in the trucks, which have since been corrected by the car builders at their expense, and we no longer have this abnormal expense. Car inspection is included in both instances.

Some idea of the difference in costs of equipment parts can be gained from the following:

	Old Motor	Safety Car Motor
Armature coils	$40	$31
Set of field coils	178	57
Commutator	60	43
Armature complete	260	200
Gear case	30	21
Car wheel	15	10
Gear	57	40
Normal horsepower	42 (500 volt)	25 (600 volt)
Continuous capacity	30 amp.	35 amp.
Continuous tractive effort	330 lb.	600 lb.

Tuesday Morning Session

Vice-President G. Gordon Gale presided at the Tuesday morning session. The first matter taken up was a report from the supply men, presented by Mr. Campbell, who said that they had met, and endeavored to formulate plans for co-operation with the association. On the suggestion of A. Eastman, acting honorary secretary, it was decided to appoint a committee of three to co-operate with the executive committee. [The manufacturers later selected Mr. Campbell; H. T. Gibbs, Canadian Westinghouse Company, and O. C. Rehfuss, Canadian Steel Foundries.]

Discussion of Monday's safety-car papers was then proceeded with. H. L. Andrews, General Electric Company, gave a digest of data from a canvass made by his company, which showed the following cost data per car-mile as to safety and double-truck cars respectively: Maintenance of way, 1.6 and 3.3 cents; maintenance of equipment, 1.7 and 3.6 cents; power, 1.9 and 3.8 cents; transportation, 8.4 and 13.9 cents; general, 2.4 and 3.2 cents; total, 16 and 27.8 cents. The total saving averaged 43 per cent. Of thirty-seven companies reporting 25 per cent increase in gross receipts had resulted from 37 per cent increase in service. Accidents for the safety cars were 0.39 per 1,000 car-miles as compared with 0.59 for the larger cars. It was estimated that 3,500 safety cars are saving the industry $12,000,000 annually.

Mr. Gale asked as to the continued durability of the safety cars under Canadian climatic conditions. Messrs. McCune and Weyman replied that experience had shown them capable of standing up in severe weather, without increase in weight. Mr. Gibbs, speaking from the standpoints of both car rider and manufacturer said that in Toronto the reduced headway with the safety cars is greatly appreciated. Only a week's publicity was necessary to convince the patrons of the necessity for forming queues. [Here another speaker remarked that if a private company asked the patrons to form queues of the length sometimes reached in Toronto on the municipal lines there would be a vigorous protest]. There street men are used to sell tickets, collect fares at the rear door, dispatch cars and form queues. Payenter collection is employed at the front door. A recent estimate of the cost of equipping the present rolling-stock in London, Ont., with complete safety devices, showed that this cost could be wiped out in a year through the results which would follow.

C. C. Curtis, Cape Breton Electric Company, said that the standard Birney car, slightly modified for the very severe climate had operated well during the past two years on his property, as had also a couple of older cars equipped with safety devices. In Halifax, twenty-four cars bought a year ago and operated on the belt line have pleased everyone concerned.

Speaking as a car builder of long experience, Mr. Campbell referred to the alternating extremes of lightness and heaviness to which car designers have gone. He noted the increasing weights of the safety car designs and predicted a continuance of this tendency. He thought Americans rather inclined to fads and did not expect the Canadians to "fall for" the safety car so speedily. He said they are not a panacea for all railway ills, and in this Messrs. Curtis and McCune concurred, the latter stating that 1-man double-truck cars undoubtedly have a place. Mr. Andrews said, however, that the Ft. Worth, Tex., cars weighing 12,500 lb. had been operating for four years at a maintenance cost of 1.9 cents per car-mile. The average reduction in equipment maintenance expense is 51 per cent. Present cars weigh 16,000 lb. but there is a tendency to lower the weight by the use of stronger materials.

PUBLICITY AND PUBLIC RELATIONS

The paper on publicity, prepared by A. W. McLimont, vice-president and general manager Winnipeg Electric Railway, was read in the author's absence by Mr. Eastman.

Mr. McLimont, speaking of publicity methods, pointed out that he believed it the duty of every street railway manager to let the public know the facts about any phases of the street railway business on which information is desired: the company's problems should be laid before its patrons, as one business man presents a mutual problem to another, to obtain assistance in its solution; that the public should know the reasons why they are requested to pay an increased fare; that the railway as a vendor of transportation plays as important a part in society as any manufacturer, and that transportation must be sold even as a manufacturer sells his product. The public is square, he said, and once people are induced to think and talk about street railway problems, their opinion will become a powerful factor, and the civic authorities will then give the street railways a squarer deal.

The right public relation, he divided into five parts, namely (1) cleanliness of equipment; (2) keep faith with employees and treat them fair; (3) be truthful; (4) all members of the organization must be good community citizens and must be "boosters," always working for the public good whenever possible; (5) determine how best the railway can serve the public.

These rules require proper publicity, which can be accomplished by seeing that (1) any statements given out either to the public or the press are truthful; (2) practice what is preached because proper publicity and right public relations go hand in hand; (3) lay the problem of the industry before all who are interested if a square deal is to be eventually secured, so that where the public is told that revenues are inadequate and unfair taxes have to be met by the car rider, they will understand what is meant.

As a means of accomplishing this desirable relation the Winnipeg Electric Railway, he said, hired H. C. Howard as publicity agent on March 1, 1918, and charged him with the duty of establishing and maintaining friendly relations with newspaper editors and reporters through personal contact. It was also his duty to prepare briefs for presentation and distribution to interested persons and organizations, make up poster announcements for the cars, edit for publication every two weeks an official organ "The Public Service News" for distribution through "take one" boxes on the cars, and lay out newspaper advertisements.

Considerable progress has been made toward better newspaper relations and the close relations together with accurate and reliable news are appreciated and the papers generally treat the company fairly. "The Public Service News" now has a general circulation of 40,000, which includes a mailing list of about 1,000, and has proved a powerful influence in bettering public relations. This organ endeavors to put before the public the operating and other problems of the company.

Car window posters have also been used to announce charitable entertainments or special sporting or other events in which the railway is interested as well as a series of drawings regarding the "jay walker" and other safety first matters.

Mr. McLimont believed that newspaper advertisements properly written and attractively set up, although expensive, afforded the best medium for reaching the members of a community. As an instance of this he outlined the plan recently followed when the city of Winnipeg attempted to start court action to upset the act of the Manitoba Public Utilities Commission increasing fares. This campaign so influenced local public opinion that the Mayor for 1921 was elected on a platform favoring round table discussion of the street railway problem instead of litigation. Even before election the mayoralty candidate made it clear that he favored granting the street railway a fare that would insure adequate wages to employees and enable it to procure necessary working capital.

The success which has been attained through publicity, he said, is not however fully explained unless mention is made of the weekly meetings of the heads of departments. At these meetings everybody is made to feel as free from restraint as possible, so that frank discussion can be held of the difficulties that occur in the various departments. These meetings have brought better co-operation among departments through the men becoming better acquainted personally and more or less familiar with the workings of outside departments. It is large through such means that the Winnipeg company was able to increase its fares three times in the past two years and to have the jitney competition which seriously threatened to upset the whole railway operation, abolished. Moreover, there has been no disagreement with the employees of sufficient importance to warrant a strike; the only strikes which have occurred were in sympathy with outside workers and were not entered into through disagreement with the company.

In closing his paper Mr. McLimont said he was not pessimistic of what the future has in store, for he believed that proper publicity coupled with a sincere desire to give efficient service would prevent the railway industry from going to the graveyard where obsolete and bankrupt transportation systems rust.

DISCUSSION ON PUBLICITY

The discussion was opened by Major F. D. Burpee, manager Ottawa Electric Railway. He referred to good public relations as the panacea for the troubles of the electric railway, in other words to the essentiality of good-will. Good advertising is the best means for inaugurating new ideas. In the past the public has been hostile to the electric railway on the assumption that the public was the "under dog." The facts must be presented, and in doing this the employees must play an important part.

Referring to Mr. McLimont's rather elaborate program Major Burpee said that all cannot do as much as this but all can do something. He then described the practices of the local company in furnishing employees with a periodical and also supplying the public with weekly leaflets. Several other speakers discussed the characteristics of good publicity, H. H. Couzens, Toronto Transportation Commission, stating that leaflets with special motives behind them are apt not to be successful. If the company can show the public that it wants to be fair the "thing can get over." The man in the street understands little of the railway business which must be explained to him from the ground up. The public judges the railway by its employees who must be carefully trained.

ACCIDENT PREVENTION IS EVERYBODY'S BUSINESS

The next paper, on accident prevention, was read by the author, R. Mayne-Reade, superintendent Quebec Railway, Light & Power Company.

Mr. Mayne-Reade in introducing his subject of safety first said that accident prevention is a duty of Christian honor not only because it seeks to save life and money and promote efficiency, but because it stimulates the fundamental spiritual idea of better human co-operation. The effort and money already spent on the safety first movement and the work of the National Safety Council, the Red Cross and other kindred organizations should have educated every man, woman, child, public utility and industrial corporation to understand that the gospel of self-preservation has become an established order in the routine of our daily life. Yet the newspapers show an appalling high toll of accidents.

It must be admitted that some progress has been made though there is an indifferent attitude, even among educated business men toward the principles of safety first. With railway employees the subject sought has been to make the men realize that safety first is just as important to them as to their employer and to the community at any work they undertake, but experience has shown that owing to man's tendency to exercise what he calls personal liberty it is imperative that education and discipline must go hand in hand. Co-operation has been effected with municipal councils, public authorities, automobile clubs and individual owners of automobiles in the interests of safety. Rolling stock has been equipped with the latest safety devices and compensation laws have been enacted by the legislatures.

Ten years ago the steam railroads headed the list in the number of fatal accidents. Today it is the automobile that heads that list. This fact assuredly indicates that there is something radically wrong in the administration and regulation of the traffic laws. The missing statute is the drivers' license law providing for the mental and physical examination of applicants before licenses are granted to drive a car. In a city where the traffic laws are inadequate and where enforcement is unfair, the motorist or driver with influence can escape punishment and citizens do not take seriously the police or court and readily blame the traction companies for any kind of a collision with a street car. Often also they procure doubtful witnesses to substantiate their alleged claims, thereby increasing the financial burdens of the utilities. This class of drivers as well as the beginner and physically incompetent will be reached through the enactment of a driver's license law.

Every careful competent driver and all pedestrians should welcome such a law. Motormen would also come under the same requirements. The law should not only set the penalty, but require the judge to assess it on proof of guilt, and the penalty should be jail instead of a fine. Every city should have its own traffic court, so that more individual attention could be given to traffic problems.

Mr. Mayne-Reade also suggested that inasmuch as the government spent large amounts of money during the war for publicity to enlist men for army and raising of funds, it should enact a law calling on publishers of periodicals voluntarily to devote a definite amount of their space to accident prevention matter. He also suggested that every theater curtain, program, etc., as well as every business card, letterhead and postage stamp should carry the safety message; further, that provincial governments should add a safety section to their education department and that electric railways as a part of their safety campaign have an exhibit during their annual exhibition on both traffic and public safety.

MR. MORLEY DESCRIBES ONTARIO SAFETY WORK

H. B. Morley, general manager Ontario Safety League, who followed Mr. Mayne-Read, said that he could not see any just cause for pessimism in regard to the safety movement. Accident prevention, he said, is scarcely "news," but an accident is "news" and receives wide publicity. Each accident reported, however, acts as propaganda in the fight against other accidents and so the world will continue to learn by the mistakes of others. It is said that an accident is "an unexpected event, a mishap" but accidents do not happen, they are caused—the result of carelessness or thoughtlessness. This is why the lesson of the safety movement is prevention. Figures prove that some of the large industries have reduced accidents in their plants, 20, 25, 40, 50 and 60 per cent. The United States Steel Corporation estimates that during its last eight years of safety work it has saved 25,863 workers from serious injury and death. This is not theory or expectation; it is a cold fact of one industry.

The Ontario Safety League was organized on Jan. 1, 1914, with an executive committee composed of representatives from various bodies likely to be interested in this work and has grown rapidly. The keynote of its campaign has been the education of the rising generation, with the thought that children taught to be careful on the street and in the home will develop into careful men and women and through the pupils in the schools, lessons in prevention will be carried into thousands of homes. The League issues every fortnight thousands of bulletins for shop posting, dealing with accident and fire prevention. For six years it has conducted for the Ontario Motor League an annual prize competition on compositions about motor accidents among pupils of the schools. Addresses are also made in the schools and in all nearly 65,000 pupils in over 1,300 classrooms have been reached. Safety buttons, bulletins, blotters, pamphlets, "letters to parents" and motion pictures have been used with success. In addition, safety patrols have been organized.

A special series of electric railway bulletins prepared by a special committee is issued regularly. Through the Department of Highways for the Province, safety rules were given out with each automobile license in 1918, 1919 and 1920. A Canadian safety convention was held last year. This year a "safety week" in Ontario was conducted from Oct. 10-16. Sub-committees covered such subjects as publicity, motion pictures, bulletins, boy scouts, traffic, schools and colleges. It was a success, with notable accident reductions.

The electric railway can afford to be a big contributor to efficient safety work as it cannot conduct a safety campaign as successfully as can a citizens' committee. Accident problems are due almost entirely to: (1) Persons boarding or leaving cars, (2) collisions between cars or between cars and other vehicles; (3) accidents to pedestrians. Each can be reduced by safety education.

Safety education, as far as the electric railways and all other industries are concerned, must start at the top. The "Big Boss" must be sincere. The campaign also must be thorough. The great difficulty today is that we are "pikers" when it comes to spending money on accident prevention. A company may pay out $100,000 in accident claims yet shrink from an expenditure of $10,000 on prevention. As regards automobiles, every driver should have a license, given only after examination. This is the greatest piece of traffic safety legislation that could be passed today.

TRAFFIC REGULATIONS

In his paper on traffic regulations, which was read by title, President Gaboury gave an account of the work during 1919 and 1920 of the committee on code of traffic principles of the American Electric Railway Transportation and Traffic Association. Mr. Gaboury has been a member for both of these for years. The traffic rules which he then presented for adoption by the Canadian Association, he said, were identical with those presented to the National Traffic Officers of America and the same as approved by the Transportation & Traffic Association at its 1920 Atlantic City Convention except for a few minor changes to render them more adaptable to Canadian cities. Mr. Gaboury appended to these rules a statement on courtesy and safety commandments. The latter follow:

Safety Commandments

Be Considerate

Be liberal towards others using the street.

Go Slow

Approaching children. They do the unexpected thing.
Passing vehicles.
Around corners.
Approaching cross walks.

Stop

Behind street cars taking on or discharging passengers.

Look Ahead

And keep on the alert for intersecting traffic.
Use tire chains on wet and slippery pavements.
Better be careful than sorry.

Safety Don'ts

Don't run fast into or across main highways.
Don't take blind curves too fast.
Don't forget that a car or a person may be just around the turn.
Don't pass street cars when passengers are boarding or leaving.
Don't forget that the other driver may be reckless or drunk.
Don't fail to look out for pedestrians.
Don't forget that children dash out suddenly and unexpectedly.
Don't take chances.
Don't drive into an uncertainty.

RESULTS OF THE ELECTION

President Gaboury resumed the chair at the close of the session and read the report of the nominating committee which was approved and the following were declared elected: Honorary president, T. A. Ahearn, president Ottawa Electric Railway; honorary vice-president, George Kidd, general manager British Columbia Electric Railway; president G. Gordon Gale, vice-president and general manager Hull Electric Company; vice-president, Major F. D. Burpee, Ottawa Electric Railway; members executive committee, R. M. Reede, superintendent city division Quebec Railway, Light & Power Company; H. H. Couzens, Toronto Transportation Commission; Edward P. Coleman, general manager Dominion Power & Transmission Company, Ltd., Hamilton; C. C. Curtis, local manager Cape Breton Electric Company, Sydney; C. L. Wilson, assistant manager Toronto & York Radial Railway, Toronto; A. W. McLimont, vice-president and general manager Winnipeg Electric Railway; treasurer, A. Gaboury, superintendent Montreal Tramways; auditor, H. E. Weyman, general manager Levis County Railway, Levis.

In closing the convention Mr. Gaboury turned the chair over to his successor, Mr. Gale, who spoke briefly and then called on John Murphy, Board of Railway Commissioners & Department of Railways & Canals, who complimented the convention on the splendid meeting and expressed his best wishes.

ENTERTAINMENT FEATURES

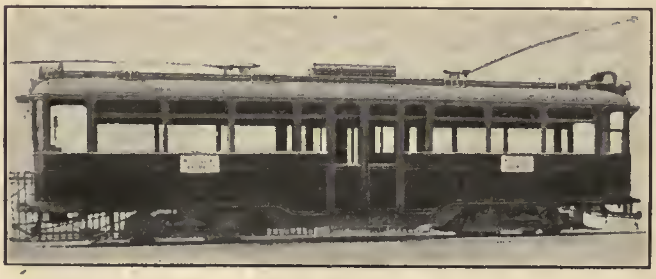
During the meeting informal get-together luncheons were held with excellent results in "breaking the ice," and on Monday evening there was a banquet at the Royal Ottawa Golf Club, Hull. As Hull is in Quebec a more comprehensive menu was possible for the dinner than on the Ontario side of the Ottawa River.

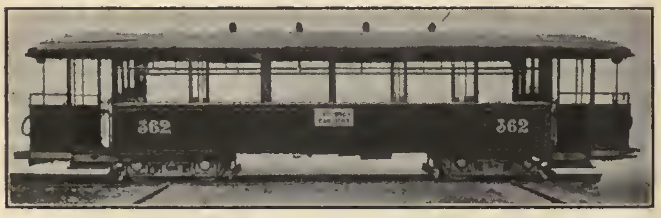
Colonel Hutcheson acted as toastmaster and in opening he proposed a toast to the King, which was received with enthusiasm. He then referred to his former long residence in Ottawa with appreciation, and called upon

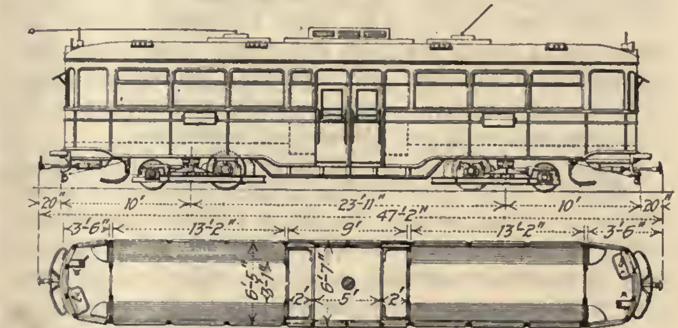
Mr. Gaboury to propose a toast to the city. The latter was followed by Hon. Frank Plant, Mayor of Ottawa, who gave details of the scenic beauties of the city, its educational facilities and the Parliament buildings. He also expressed appreciation of its railway system.

T. Ahearn, president Ottawa Electric Railway, proposed a toast to the association, tracing briefly its history and referring to the early days of the local railway. Just thirty years before he had employed J. E. Hutcheson on the property and he said that great credit is due to the Colonel for the development of the property. Mr. Gale, vice-president of the association, responded, outlining the plans of the executive committee for the coming year.

Acton Burrows, honorary vice-president, was asked to propose a toast to "Our Guests," which he did with many witty sallies. Three guests responded to this toast, H. H. Couzens, for the commission representatives; Capt. Emilio Trudel, Chief of Police of Quebec, for the police department, and O. C. Rehfuss for the supply men. Mr. Couzens told briefly what in principle the Toronto Transportation Commission plans to do; Captain Trudel apotheosized Quebec and urged that the 1921 convention be held there, and Mr. Rehfuss outlined the labor shortage problem from the standpoint of the manufacturer.







NEW MOTOR CAR AND TRAILER FOR GENEVA, SWITZERLAND
Above at left, motor car; below at left, trailer; at right, plan and elevation of motor car

The last toast was to the press, proposed by Major F. D. Burpee and responded to by H. H. Norris, managing editor ELECTRIC RAILWAY JOURNAL, and E. W. Harrold, city editor Ottawa *Citizen*. Major Burdick expressed the debt of the industry to the press, while the editors explained the relation of their profession to the electric railway. During the dinner the guests were entertained by vocal and instrumental music of very high grade.

Before the meeting broke up Mr. Gaboury paid a tribute to the toastmaster, who responded by telling how he had endeavored to build up the Montreal property, which had only been possible through the co-operation of Mr. Gaboury, Mr. Blair, Mr. Graves, Mr. Bird and their associates.

On Tuesday afternoon the convention attendants visited the Ottawa Car Manufacturing Company's works to inspect its new safety cars, and the shops of the local company. Some also went through the new Parliament buildings.

New Motor Cars and Trailers for Geneva

Swiss Tramway Will Try Cars of Types Novel to Them—Trailer Was Designed for Lightness and Smooth Riding Qualities—Electric Braking a Feature of Motor Car

TWO years or more ago the Geneva (Switzerland) Electric Tramways Company ordered from local manufacturers twenty motor cars (ten single-truck and ten double-truck) and ten double-truck trailers. These are now nearly if not quite all delivered. As the cars differ in some respects from the types popular in this country and as they may be assumed to be typical of the latest tramway rolling-stock ideas on the Continent the following facts regarding the two double-truck types are given, based on an article in *Schweizerische Bauzeitung* for Nov. 27, 1920.

The motor car is of the center-entrance and exit type, which is uncommon in Switzerland. The body is of steel and it is divided into five compartments, separated by bulkheads with sliding doors. The central section contains a well extending across the body, with a step each to the forward and aft main compartments. This vestibule will accommodate eighteen persons standing. The main sections contain longitudinal seats, each section seating eighteen. At the extremities of the body are the motorman's compartments, the forward one being closed off in operation, while the rear one is left open to increase the carrying capacity.

The car is mounted on maximum-traction trucks and is driven by two 50-hp. motors, with a 5.42 to 1 gear ratio. The motor is equipped with ball bearings. The car length over buffers is 47 ft. 3 in. and its weight, empty, is about 22 tons. It is provided with air brakes and with positions on the controller for producing electric braking also. The starting resistors are mounted centrally on the roof.

The trailers are of a new type, designed for use on suburban lines to have a large capacity (thirty-four seats and thirty standing places plus fifteen on each platform). The over-all length is 42 ft. 7 in. and the weight, empty, is 11.6 tons. Like the motor car, the body is of steel construction. Special attention was given, in the design of the trailer trucks, to the producing of easy-riding qualities. This was accomplished through the use of lateral leaf and helical springs.

The Central Electric Railway Accountants' Association, at its recent convention at Dayton, Ohio, was entertained at luncheon by the Ohmer Fare Register Company. The twenty-five or more members in attendance stopped en route to the factory for a brief reception at the home of John F. Ohmer. The same hosts also provided theater parties for the evening.

Opinions Regarding Indorsement by the Association of Reports of Federal Electric Railways Commission and of Chamber of Commerce Committee

The Chairman of the Publicity Committee of the Association Urges Indorsement by Industry of Broad Findings of Commission—Views Are Expressed by Executives in Texas and Ohio—B. C. Cobb Gives the Views of a "Car Rider"

THE *program for the Chicago conference on Feb. 10 shows that the afternoon session is to be devoted to the consideration of the report of the Federal Electric Railways Commission and the report of the special committee on public utilities of the Chamber of Commerce of the United States. President Gadsden in a special letter to member companies has urged the association to take action with respect to the conclusions and recommendations contained in these reports and has expressed his opinion that nothing that the association can do will be more helpful than to place itself squarely upon record before the public in this matter. Mr. Gadsden personally is on record as believing that the industry should make a public announcement that it accepts these reports in principle.*

Last week's issue contained expressions of opinion on this subject from the chairman of the Committee of One Hundred, two railway executives and one public utility commissioner. Views from several others appear below.

⁂

Barron Collier, chairman of the committee on publicity of the American Electric Railway Association, says:

"As an advertising man who is vitally interested in creating public good will for the electric railway industry, I hope that the American Electric Railway Association will indorse the broad general principles of the reports of the Federal Electric Railways Commission and the Chamber of Commerce of the United States.

"These reports contain very helpful material for electric railway operators, and I believe that the broad findings of the commission are such as to warrant their indorsement by the industry.

"My particular interest in seeing the reports indorsed is that of again carrying to the public conviction of our honesty of purpose. At the outset of these hearings we told the public and the press that we were anxious to have a fair and impartial investigation of our case and that we were willing to stand on the findings of any fair jury. We were extremely fortunate in obtaining the services of men of the highest character on both the federal commission and the Chamber of Commerce committee, and I think it can be truthfully said that they made very full inquiries and, in their judgment, rendered fair reports.

"Meantime the press and public, convinced of our sincerity in urging these investigations, followed the activities of both the commission and the committee with sympathetic interest. It now behooves us to reassure the public that we were sincere in our expressed desire for an impartial investigation of the industry."

COL. J. F. STRICKLAND *is president of the Dallas Railway and a member of the Committee of One Hundred. He has taken an active part in the development of electric railways in Texas and writes under date of Jan. 27:*

"Referring to the article on page 136 of the issue of Jan. 15, headed: 'Consideration of Federal Report Urgent,' in which reference is made to the letter recently sent out to all executives of member companies of the American Electric Railway Association by President P. H. Gadsden, I am struck with the importance of some decisive handling of the matter by the association at its midwinter meeting in Chicago in February.

"I am thoroughly in accord with most of the conclusions reached by the Federal Electric Railways Commission and also by the special committee of the Chamber of Commerce of the United States, and I feel that it is up to the executives of street railways forcibly to bring to the attention of the public the findings of these two important bodies. If we do not avail ourselves of the opportunity of bringing to public notice in every way possible the present status of the street railway business as set forth in these reports we are certainly unmindful of the great effort, as well as the time and money, expended in developing for public information the complete story of street railway operations.

"I trust, therefore, that the association at its meeting in February will recognize the importance of the matter and will accordingly go on record in no unmistakable way."

⁂

NORMAN McD. CRAWFORD, *vice-president and treasurer of the Columbus Railway, Power & Light Company, Columbus, Ohio, was another member of the Committee of One Hundred who was asked to give his views on the subject. Mr. Crawford said:*

"I regret that I must plead guilty of at least one fault pointed out so forcefully and clearly in the interview with President Gadsden, recently published in your journal, and I confess that personally I have treated as of local importance only many of our problems which should have been recognized as of interest to the industry as a whole.

"In the short time allowed me, I have not been able thoroughly to consider the findings reached and the recommendations made by the report of the Federal Electric Railways Commission and the public utilities committee of the United States Chamber of Commerce. I have, however, abiding confidence in the personnel of the committee appointed by President Gadsden to report its recommendations relating to the reports above mentioned, and I feel that as suggested the electric railway interests of the United States will be advanced and broadened not only from the viewpoint of the industry but also from the viewpoint of the public at large who are our patrons if the association at its midwinter meeting treats this problem fearlessly, fairly, frankly.

"It is axiomatic that adequate electric railway service is a public convenience and necessity, and because it holds the most important and constructive relation to the best interests and upbuilding of the community this form of transportation should not be discontinued or impaired. It is also axiomatic that unless the public authorities allow such reasonable return upon the investment as will attract capital and provide for the continuance of the service operation in such cases must cease. In cases of discontinuance transportation could only be provided by the questionable method of municipal control, which has recently (particularly in the case of Seattle) proved itself to be such an utter failure. It would then appear that the public ultimately pays for adequate transportation, whether by means of increased fares or by means of increased taxation, in cases where the operation is taken over and conducted by the method of municipal control.

"Personally I do not have the fullest confidence in the remedy applied by a service-at-cost method, although in many instances this method has provided at least temporary relief for the operating company. It is therefore to be hoped that full and frank discussion of the reports, as suggested by President Gadsden, may result in a united effort which should undoubtedly tend to solve the problems in hand."

◆

JOHN J. STANLEY, *president Cleveland Railway and past-president American Electric Railway Association, is strongly for indorsement. His position is defined in the following statement:*

"Whatever the objections of our member companies to any of the opinions and conclusions in the reports of the Federal Electric Railways Commission and the special committee of the Chamber of Commerce of the United States, indorsement by the Association of these reports would define the attitude of our industry toward the public and itself as no purely local discussion can define it. Personally, I feel that such action taken by the association cannot be but wise, even though it creates some inconsistencies in the positions of some member companies. I do not fear the latter.

"The great need of the public utilities as I see it is a removal of the distrust, dislike and disinterest which exist with so many of our customers. If endorsement of these reports will help change this attitude of the public we serve I am for indorsement, being more concerned with the remedy than with its application."

THE American Institute of Electrical Engineers has been designated as sponsor for the rating of electrical machinery by the American Engineering Standards Committee, and the responsibility for the work has already been officially accepted by the Institute. A sectional committee has been formed, which is rapidly pushing the work so as to prepare for the next meeting of the rating committee of the International Electrotechnical Commission, at which the fundamental basis of rating will be discussed. At the last meeting of the rating committee, held in Brussels in March, 1920, the American delegates presented a proposal for a system of rating based upon the "hot-spot" principle.

A Car Rider's Reply

Readjustment of Securities to Accord with the Value of Company's Property Would Not Only Often Inflict a Great Hardship on Stockholders but Would Accomplish No Useful Purpose

By B. C. Cobb
Vice-President Hodenpyl, Hardy & Company, Inc.

I LIVE in a large city, am engaged in business and am a car rider. My office is located several miles from my home, and it is almost always my daily habit to ride to and from my office on the cars, usually during the morning and evening rush hours. My opportunity therefore for observing transportation problems along with car riders' demands and complaints has been quite considerable.

I went to work at the age of eighteen. My first job was with a transportation company. I continued in this line of work for several years and became acquainted to some extent with the many difficult operating and financial problems with which most transportation companies have to contend. Perhaps my views at that time were biased, perhaps I was all too sympathetic with the trials and burdens of the company, and perhaps I was at times unmindful of the public and its desire to be served. I could not, however, have erred to any great extent, for our chief was a stickler for good service and a martinet in discipline. He believed in a fair service for a fair charge; he believed in a fair wage for a fair day's work; he expected to pay and expected to receive; he believed in fair pay for a satisfactory service rendered. One thing he always preached, and that was that a property is entitled to a compensatory return on the investment necessary to render service, *i.e.*, a fair return on a fair valuation.

I remained in the transportation business for some years, only leaving the service because I thought I saw greater opportunity for advancement and the acquirement of worldly possessions in other lines of business. I have, however, retained my love for transportation work, which most railway men do, and I have always been interested in transportation problems.

I was therefore much interested the other day in reading in the ELECTRIC RAILWAY JOURNAL of Jan. 1 an interview with Philip H. Gadsden under the caption "Ask the Car Rider." It was a very good article in many ways and I think Mr. Gadsden's thought was and is to impress the public with the dire necessities of the street railway industry and the importance of re-establishing its credit in order to be able to continue serving.

I commend Mr. Gadsden's views in these particulars and I agree with him that unless the credit of the electric railway industry is re-established it cannot continue. I do not, however, agree with some of Mr. Gadsden's spoken thoughts and written views on the so-called service-at-cost franchise, particularly his views as to making the securities at present outstanding on a property fit a valuation made. Mr. Gadsden correctly states that the basic principle of a service-at-cost franchise is the value of the property in question. The valuation of a property surely is an adjunct, and a most important one, in working out a service-at-cost franchise, for unless a valuation is made there will be no way of determining the proper amount which a company is entitled to earn.

Where Mr. Gadsden and I disagree is on his advocating that once a valuation is found then the securities outstanding should be made to conform to such valuation. He does not say this should be done in every case, but I am satisfied that most people reading the article will gather that impression. My thought therefore is to correct it, because I think it would be a catastrophe to the industry and the last straw to break its back should such an impression become nation wide and such action be insisted upon by the authorities and people interested.

NO DIRECT CONNECTION BETWEEN CAPITALIZATION AND SERVICE AT COST

To readjust the securities of a company to fit the physical value of the property would not only be in most instances a difficult job but in a great many instances absolutely impossible except by putting the company through the hands of a receiver. I do not say that it may not be advisable in some cases to re-establish the financial stack-up, or rather readjust the outstanding securities, of a company, but I do say, and without fear of controversion, that this is not an essential of a service-at-cost franchise. The essential things in a service-at-cost franchise are:

1. A fair valuation of the property in question, not only its physical but all other values.
2. A fair return on the valuation so found.

The securities outstanding have very little, if anything, to do with the matter, and I therefore think it is a great mistake to lead people so to think. A property may have bonds, preferred stock and common stock issued, and in considerable excess of the actual value of a property—all without working a hardship upon the car rider, the public or the stockholder. For example, let us assume, and such an assumption is an actual condition existing today in many cities of the country, a company capitalized as follows:

Six per cent bonds outstanding		$4,000,000
Six per cent preferred stock outstanding		2,000,000
Common stock outstanding		3,000,000
Total capitalization		$9,000,000
Actual valuation found by inventory and appraisal		7,000,000
Rate of return allowed		8 per cent
This would mean that a property capitalized and valued as above would be allowed after providing for operating expenses, taxes and depreciation, to earn annually		560,000
It would mean that after paying—		
Interest on bonds	$240,000	
Dividends on preferred stock	120,000	360,000
there would be left for the common stock		200,000
or, if it were all declared out in dividends, a return on the common stock of		6⅔ per cent

Here would be a case where the outstanding securities exceeded the valuation found by $2,000,000. What good, I ask, would it do to make the securities conform to the valuation? None at all as I see it, and if it were done it might and probably would work a great injustice and hardship to many stockholders interested.

MAY PUT BLAME ON WATERED STOCK

Mr. Gadsden wants to "come clean," and that is what he probably had in mind when advocating a readjustment in securities. He wants the public to feel and the car riders to know that the companies want to meet it and them more than half way in order that the credit of the industry may be re-established and the companies thereby enabled to render the service which they should render. This is very commendable, but the fault I find with such teaching is that many people will draw the wrong conclusion and begin again to think that the main trouble, and practically the only trouble, with the electric railway industry is that it is overcapitalized, and that the thing which has broken it down is watered stocks and inflated securities.

I am a stockholder in a number of railway companies and other public utilities and I do not believe and do not think the public generally has now any such view of the situation. It has been educated and truthfully taught in the past few years that this is not so, and I as a car rider and a stockholder feel that it is a serious mistake to undo such teachings.

The truth of the matter is that the electric railways and other public utilities have broken down during the past four or five years of strenuous life because of the many heavy burdens placed upon them in the shape of increased operating expenses, increased taxes and increased cost of money, without being allowed to earn an adequate and compensatory return upon the value of the properties. It is just as plain as a pikestaff, and no one need get out a pair of binoculars to see this very clearly. It is therefore idle to talk about watered stocks and inflated securities, for they have nothing whatever to do with the case. There can be no such thing, because in these days and in this age a public utility company will not be allowed to earn except upon its value ascertained, and it is a sure thing that, this value being once obtained, a company will not be allowed to earn an excessive return upon it. It therefore follows that what it does earn can without detriment to any one—car rider, public or any one else—be distributed by the directors or the stockholders as they may see fit.

FAIR RATE OF RETURN ON FAIR VALUATION

It is all right for the utilities to "come clean" and if it is necessary for any of them to "clean house" they should do it. The public and the car rider, however, should also "come clean" and not allow the political agitator or sensational newspaper to lead them astray. They should learn that unless a company is allowed to earn, and to earn on a full and proper value and not a depreciated value, it cannot serve. They should go further and insist that the authorities allow the utilities to earn. If they do not it will not be the utilities only that will suffer, for the public itself will reap the harvest in inadequate service rendered, stagnant industries and depreciated values of all kinds.

The car rider, while he may many times have just cause for complaint, is not usually unreasonable unless led astray by demagogic teachings. He is more interested generally in the character of the service rendered than in the dividends a company may be paying, and nine times out of ten will be a defender and proud of the company rendering the service if it is the kind of service he desires.

The problem as I see it is to tell the public the needs and necessities and to get the rate-making authorities having these matters in charge to allow the public utilities to earn a proper rate of return so that they may perform and function in the satisfactory way the public wants them to perform and function.

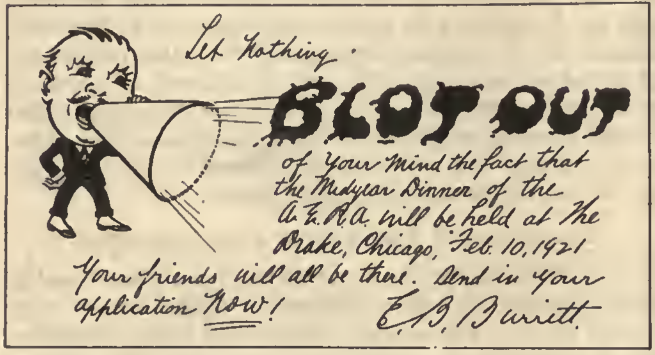
A fair rate of return upon a fair valuation should be the slogan of the utility man. If he departs very far from this path or this line of thought, or if he mixes up the matter of readjusting securities with this sort of doctrine, he is very apt to make the situation complex not only for himself but also for the people desiring service.

Association News

Get Aboard the Special for Chicago

THE midyear conference committee on transportation for New York and vicinity, of which Carl H. Beck, Westinghouse Electric & Manufacturing Company, is chairman, reports that enough reservations have been received practically to fill two special cars. These cars will be attached to the "Broadway Limited," leaving New York Feb. 8 for Chicago, via the Pennsylvania Railroad. All delegates from New York, Philadelphia, Washington and Pittsburgh leaving for Chicago on Feb. 8 are urged by the committee to travel on this train.

The Pennsylvania Railroad will reserve as many as five cars for members if notified in advance. Accommodations can be secured by application to E. B. Burritt, secretary American Electric Railway Association, in accordance with the schedule published in this paper Jan. 15, page 146.



Let Nothing · BLOT OUT of your Mind the fact that the Midyear Dinner of the A.E.R.A. will be held at The Drake, Chicago, Feb. 10, 1921

Your friends will all be there. Send in your application Now!

E. B. Burritt.

Committee on Schedules Meets

THE committee on economics of schedules held its initial meeting at association headquarters on Jan. 24. Among those present were Chairman Edward Dana, Boston (Mass.) Elevated Railway; H. C. Moser, Fifth Avenue Coach Company, New York; J. A. Stoll, United Railways & Electric Company, Baltimore, Md.; Samuel Riddle, Louisville (Ky.) Railway; Donald Goodrich, Twin City Rapid Transit Company, Minneapolis; A. G. Neal, Washington Railway & Electric Company, Washington, D. C., and J. M. Campbell, Atlantic City & Shore Railroad, Atlantic City, N. J. The full list of members of this committee was printed in the issue of this paper for Jan. 22, page 189.

The committee decided that the subcommittee plan of making out the report would be followed. A joint data sheet will be issued shortly requesting information as to what constitutes car-hours and man-hours in schedules, for the purpose of properly defining the various subdivisions that are naturally made of these two important traffic statistical units. The subcommittee to develop proper definitions of car-hours and man-hours, together with their subdivisions, consists of Messrs. Neal, Stoll and Dana. Consideration of variable running time, looking toward definite recommendations, is in the hands of another subcommittee composed of Messrs. Moser, Campbell and Riddle.

Messrs. Goodrich, Sullivan and Ives constitute a subcommittee to prepare a summary of recent methods that have been developed for improving the handling of traffic in congested centers.

It is expected that the committee will meet again early in March.

Educational Plans at Hampton

THE feature of the meeting of the Newport News & Hampton company section held at Hampton, Va., on Jan. 21 was a discussion of the practicability of operating a night school in connection with the section work. Such work has been conducted by the section before with satisfactory results. Discussion at the Jan. 21 meeting brought out the fact that the secretary of the local industrial Y. M. C. A., who had spoken at the preceding meeting, had offered his co-operation in this work and the members of the section felt that this would be of great help to them.

The membership committee reported a membership of ninety-nine, and the executive council in its report stated that progress has been made in the endeavor to obtain suitable quarters for a general reading room and meeting place for the section.

To lighten the serious discussion several entertainers were introduced, and they furnished stories and music which doubly insured the success of the meeting.

Letter to the Editors

Problems Ahead for Trolley Bus

NEW YORK CITY, Jan. 31, 1921.

To the Editors:

The article on the trackless trolley by H. L. Andrews in your issue for Dec. 4 was very interesting. Probably Mr. Andrews, as well as many others of your readers, knows that a trackless trolley line was built and operated in Greenwich, Conn., before there were any trolleys run on tracks, but it is not my purpose to speak on the American history of such projects.

It is to the road conditions that I wish to call attention, because Mr. Andrews devotes but two short paragraphs to these. To a large extent road conditions will govern the usefulness of the trackless trolley, and the places where trolley extensions are desired are usually those where there are either no roads or very poor ones. In most instances it will be necessary to build suitable roads before the trolley bus can be operated. Good roads now cost almost as much per foot as good tracks, and upkeep of roads is a problem in costs which keeps our highway engineers awake o' nights.

The proper location of the overhead wire is another problem. If it is put at the side of the street, near curbs, there will be interference with parked vehicles. Some provision must then be made for the bus to turn out of the way without losing its trolley-wire connection. For general work a center location would be best. Vehicles can observe the rules of the road better with a center location, and considerable traffic difficulty might easily arise with a bus moving along the left-hand side of a road or street against the traffic which follows the American rule: "Keep to the right."

Before the trackless trolley scheme is put out as a definite proposition in this country, the problems above noted will doubtless need to be worked up in greater detail.

"ENGINEER."

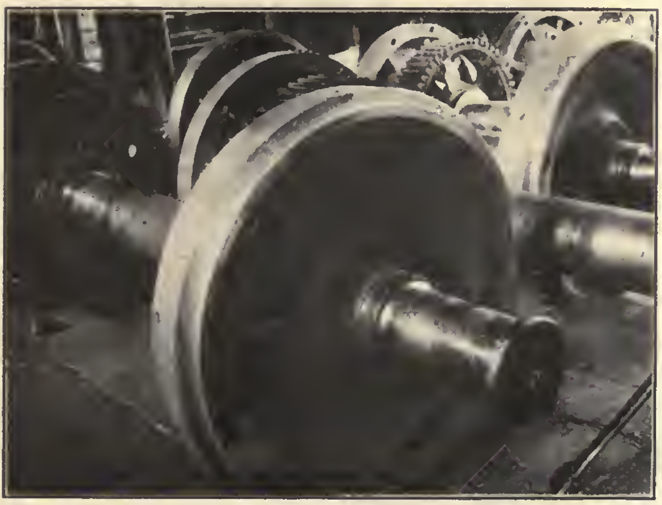
Shop Notes from Vancouver

With Special Reference to the Practice of Turning Down Worn Steel Wheels to Form Centers for Tired Wheels —Preference Shown for Steel Wheels on British Columbia Electric Railway

THE British Columbia Electric Railway has extensive shops located at Vancouver and New Westminster, where more than 400 passenger and express motor cars, 500 freight and other cars and seventeen locomotives are maintained.

Routine inspections and light overhaul are given the cars in accordance with the usual practice and a general overhaul is given them at wheel-turning time; that is, every thirteen or fourteen months.

In the city service both cast-iron and steel wheels are used. The preference is for the steel wheels, which are first allowed to wear down to a given diameter and are then turned off to form centers for tired wheels. The tires are shrunk on and, of course, the centers last indefinitely.



WORN INTERURBAN STEEL WHEELS TURNED DOWN TO FORM CENTERS FOR TIRED WHEELS

YOKE FOR HOLDING UPPER HALVES OF MOTOR CASES IN POSITION DURING OVERHAUL

The steel wheel, A. E. R. A. standard Section B, begins its career with a diameter of 33 in. It is worn down to 29¼ or 29⅛ in., and is then turned to 29 in. in the form shown in an accompanying illustration. The tire, 34 3/16 in. in diameter, is then shrunk on. It is a three-wear tire and is used until it has come down to 31½ in. The original wheels are of Midvale make. The tires in unfinished form are admitted to Canada free of duty.

Some mileages regarding these wheels are as follows: A recent average of 350 solid wheels showed a life of about 195,130 miles, ranging between a maximum of 320,000 and a minimum of 119,800 miles. They were then available as centers for the tired wheels. The tires had an additional life of 176,000 miles each. The average mileage between turnings over a long period has been about 65,000 miles.

The best record for cast-iron wheels is about 116,000 miles, but the range was wide, indicating a very irregular life, and the average was only 46,140 miles. Davis wheels are being tried out in Victoria, where the electric railway lines are also operated by the British Columbia Electric Railway, as there are no facilities for tire turning at this point.

The preference of the company for steel wheels is due to the following experiences: It was found that the cast-iron wheels, unless ground, are more noisy and are hard on axles and bearings. They tend to skid, and have to be scrapped when flats are produced. Chipping of flanges and treads also causes shopping of cars at odd or unscheduled times, an expensive operation. It is found that cars with iron wheels are shopped five times as against twice for those with steel wheels.

As to relative costs, based on recent prices, the cast-iron wheels cost most per thousand car-miles, the steel wheels slightly less and the tired wheels much less, or respectively 43.8, 42.1 and 30 cents per thousand car-miles. The 1920 costs for new wheels were $27, $54 and $30 respectively, and the scrap values $7, nothing and 95 cents.

The original stock of rolled wheels which now furnishes the centers for the tired wheels was purchased in 1910 and 1911. By 1917 the rolled steel wheels had increased in cost to $63 each. After this year the company purchased few new rolled wheels. In that year the 33-in. cast-iron wheels were costing $19 each, with $4.50 scrap value.

On the interurban cars only the steel or steel-tired wheels are used. The solid wheels wear from 150,000 to 276,600 miles and the tires give 112,700 miles additional life each. The American Electric Railway Association standard A wheel is used in this service. The tire fastening is the well-known Midvale bolted type.

Wheel changing in this shop has been made a subject of special practice until it is now possible to change a pair of wheels in from twenty minutes to a half hour.

Among the original "stunts" which have been developed in the Vancouver shops, one shown in the second illustration is of interest. This consists of holding up the upper halves of the motor shells during overhaul by means of a yoke. The yoke is simply a channel-iron blocked up at a suitable height from the truck center plate. The ends of the yoke are bent up at an angle of 30 deg. or so, suitable for connection by means of bolts and nuts with the bales on the motor cases.

One of the latest trolley bus services to be inaugurated is that in York, England, which was installed just before Christmas. The route lies through one of the congested sections of the city and serves a populous suburb. The buses have been well patronized.

Recent Happenings in Great Britain

Interesting Review Is Presented of Social and Economic Conditions at End of Year

(From Our Regular Correspondent)

The year which at the time of writing has just expired has not been a favorable one in Great Britain either for industry in general or for the tramway industry in particular. In every direction there has been the same tale of increasing cost of living, increasing cost of all sorts of materials, and ever rising wages, coupled with a reduction in working hours and output. In one industry or another we never seem to have been clear of strikes or threats to strike.

THE building trade has been peculiarly hopeless, because in spite of a famine in houses and of a smaller number of men being employed in the industry than before the war the trade unions concerned have steadily refused to let into their ranks large numbers of ex-service men who are out of employment. Near the end of the year the government promised to take drastic action, but in January matters were still in suspense.

In consequence of high wages, reduced output and a falling demand for many articles owing to price, unemployment began to get serious during December and the outlook for the winter was bad. Organized utility works, principally road-making, have been put in hand to afford relief.

There are, however, some encouraging features. The settlements arrived at with the railway men and the coal miners promise to obviate strikes, and the output of coal has already begun to increase. The railways, however, are still working at a loss.

HOPE SEEN IN INCREASED PRODUCTION

In connection with manufacturing some people in a position to judge see a ray of light in the direction of increased output. It is said that many of the workmen are less averse to piecework than they have hitherto been. If piecework is largely adopted the "go easy" trouble will disappear, and the hope is that while the men may make even higher wages than before, production will be so augmented that the price of the finished articles will come down. But in the meantime steel, for example, can be imported from the United States and from Belgium at much lower prices than those for the British-made article.

Manufacturing and contracting work for tramway purposes has naturally been in a depressed condition. Practically no track extensions are being carried out and renewals of track and plant are kept down as much as possible in the hope of lower prices in the future. In the tramway industry itself the year has seen further increases of wages and of fares.

In January a national demand for more wages was still unsettled. The tramway authorities believe that in many cases they have reached the limit in fares—that is to say, further increases would so reduce the number of passengers that no increased revenue would be obtained. Accordingly they say they cannot pay higher wages, and they point out that at present there is an average loss on working of about 3d. per mile run. Unfortunately in the case of drivers and conductors the nature of the work precludes any possibility of "increase of output." The financial future of the industry is very uncertain.

The tramway men's wages dispute continued during December. As previously mentioned the employers had refused to concede the demand for an increase of 12s. per week and they declined a proposal by the men for arbitration on the ground that if an award of an increase were given they could not pay it. In the middle of December the Ministry of Labor intervened in the hope of bringing about a settlement. The employers, however, stood firm, and the Minister thereupon decided to set up a court of inquiry under Part II of the industrial courts act of 1919. The concurrence of the parties is not necessary for the holding of such an inquiry, and the finding of the court has no binding force on the parties. The idea is that an impartial and just decision will commend itself to the public.

In the present case, however, soon after the decision to institute the court was announced, both employers and employed agreed to be represented before it. It was not till Jan. 8 that the constitution of the court was announced. It has five members, including representatives of employers and employed. The court is instructed to inquire into the causes and circumstances of the dispute and to report thereon to the Minister of Labor. At that time of writing the sittings of the court had not begun.

NEW BILL NEEDED

Shortly before the parliamentary session closed at Christmas the government withdrew its electricity bill, which had long been pending, as its compulsory powers in connection with the formation and functions of district electricity boards had excited much opposition. Instead the government intends to promote in the coming session a smaller bill containing powers which the Electricity Commissioners (established under the existing act) consider urgently necessary. The bill will confer on the local joint electricity authorities (which are voluntary, not compulsory bodies) powers to borrow money and raise capital. Provision is made for revision of maximum charges every three years instead of five. It is further proposed that owners of large railway and tramway generating stations shall be entitled to dispose of surplus power for general public purposes.

Discipline has become slack in many cases compared with pre-war days. There is, however, at least one heroic municipal tramway committee left in the country—namely, that of Newcastle—which was not afraid to assert itself. The Newcastle tramway employees took a ballot, the result of which was a decision not to work on Christmas Day. The tramway committee, on its part, held that the public convenience demanded that a service should be maintained. It offered the men double pay for the day and it told the public that the service would be run as usual. When the day came out of 950 men only 237 failed to put in an appearance for work and the cars were taken out in the ordinary way.

The committee followed up its energetic and successful action by deciding on Christmas morning that the men who had not reported for duty should be suspended till the following Thursday (Christmas was on a Saturday), when a final decision would be made. The peculiar fact was ascertained that many men who voted in the ballot for taking the holiday actually reported for duty, while others who voted for working did not report for duty because of loyalty to their trade union. When the tramway committee met again on the following Thursday a deputation from the men appealed for the reinstatement of the 237 who had been suspended. The committee thereafter passed a resolution instructing the general manager to reinstate the men and to inform them that the committee trusted that it would not become necessary in future to deal more drastically with such serious breaches of discipline. Over half of the men who were suspended had been only two years or less in the service of Newcastle tramways.

Another example of the enforcement of discipline by a municipal tramway authority comes from Edinburgh. It may be recalled that some time ago the tramway conductors in the city determined to refuse to allow any standing passengers inside the cars. A strike took place and twenty-one men who persisted in this course were dismissed. The matter came up for review before the Town Council on Dec. 22, when an appeal for the reinstatement of the men was circulated by their trade union. By forty-six votes to four the Town Council confirmed the view of the tramway committee that the men dismissed should not be reinstated. The chairman of the committee said that since the Town Council took over the undertaking from the tramway company which had previously worked it that working conditions of the employees had been vastly improved. The position taken by the men was an attempt to defy the committee and the management and to control the undertaking.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Toledo Grant in Effect

Seven-Year War Ended with Acceptance of Service-at-Cost Plan of Operation

Acceptance of the service-at-cost ordinance at Toledo, Ohio, was filed with the city clerk at 11:59 o'clock on Monday night, Jan. 31, and Toledo began its twenty-fifth-year experience with the Milner franchise plan. The only portion of the ordinance which has not been complied with by the Toledo Railways & Light Company is the section which provides that the property shall be turned over to the Community Traction Company "free of all mortgage encumbrances."

In lieu of releasing the first mortgage on the property at this time, which would have required the raising of an additional $1,900,000 in cash by the Doherty interests, an agreement between the city of Toledo and the Cities Service Company, the Doherty holding corporation, was executed by which the city sinking fund trustees shall have possession of the $8,000,000 of the company's bonds and the 6 per cent revenue accruing from the operation of the lines until the money to release the mortgage shall have been raised and the lien discharged.

The time limit for the accomplishment of this financing is set as Dec. 2, 1921. If, by that time, the company has not raised the necessary cash, the ordinance may become ineffective and the company will forfeit $500,000 in cash, which will have accrued to the bonds. If that much has not been received into the fund the Cities Service Company agrees to make up the balance to $500,000.

On Monday afternoon the officials and directors of the Community Traction Company met and elected permanent officers. Frank R. Coates was chosen president and general manager. He is the only official permitted to serve both companies by the terms of the ordinance.

Joseph Enright was made superintendent of roadways and equipment and Albert Swartz, superintendent of transportation. Arthur P. Nicklett was made secretary, treasurer, purchasing agent and auditor, and Vincent J. Waltz, claims attorney. T. H. Fair, vice-president, and F. L. Blackburn, assistant secretary-treasurer, are both with the New York office of the Doherty interests. The directors are Frank R. Coates, Albert Swartz, Henry Friede, C. T. Munz, Joseph Enright and W. L. Milner, representing the city.

The new rates of fare went into effect with the midnight line up on Monday night. They are 6 cents for fare and 1 cent for transfer. Tokens are still being issued at a rate of five for 30 cents.

Interurbans entering the city will continue to charge 7 cents for the city fare until new contracts are made. These will have to be negotiated between the commissioner, the railway and the interurban lines. They are subject to arbitration also.

The new commissioner at Toledo will make a study of the system here and proceed to establish minor changes in service looking to economy in operation.

Car Jumps Bridge Into River

A car of the Intertate Consolidated Railroad, Attleboro, Mass., jumped the rails on Lebanon bridge near Attleboro recently and, held by the resistance box, balanced over thirty ft. of water in Ten-Mile River. Motorman Percy Titus was trapped in the vestibule and after smashing the door and window at the end of the car nearest the water crawled into the car. Conductor Robert Pardington, climbed into the rear vestibule high in the air, smashed the door and helped the panic-stricken passengers down to the bridge floor, 8 ft. below. Although the ten passengers were thrown to the lower end of the car, no one was seriously injured.

CAR SUSPENDED OVER RIVER

A combination of slippery rails and a bad curve is believed to have been the cause of the car jumping the track and crashing through the bridge railing and the forward end plunging into the water.

The accompanying illustration is published through the courtesy of the Boston *Post*.

Municipal Line Starts

First Section of Detroit's New System Has Been Placed in Service—Fare Five Cents

Regular service was started over 13 miles of track of the municipal railway lines at Detroit, Mich., on Charlevoix and St. Jean Avenues at 4:30 a.m. on Feb. 1. The Charlevoix cars run from Alter Road to Belleview Avenue and the St. Jean cars run from Montclair and Harper Avenues to St. Jean and Kercheval.

Every detail incident to a regular operation of the first two of the municipal lines has been worked out by Joseph S. Goodwin, general manager of the Detroit Municipal Railway. A 5-cent fare is being collected and five-minute service will be given until checkers determine just what service is adequate. Eighteen of the twenty-five cars now on hand are being used.

The beginning of service was marked by little ceremony. Following an inspection trip made over the lines a few days after their completion Mayor Couzens expressed his satisfaction with the progress made and the work done. Other city officials also made the trip over the completed sections with the Mayor.

Connections are made with the Detroit United Railway's lines at the Mack-St. Jean intersection and at the intersection at St. Jean and Kercheval Avenues, but no transfer arrangements have been made with the Detroit United Railway. Passengers riding over both lines will have to pay two fares, the 5-cent fare on the municipal line and the 6-cent fare to the Detroit United Railway. Transfers from one municipal line to the other will be issued free.

The cars being operated on the city lines are of the one-man safety type. To permit this an ordinance passed several years ago prohibiting their use in the city of Detroit was amended by the City Council. The Detroit Federation of Labor is opposed to the operation of one-man cars on the grounds that they are unsuitable for local traffic and reduce the chances for employment. This argument relative to the matter of employment was also advanced in opposition to the use of the one-man cars when the original ordinance was passed.

About forty operators for the city cars have been trained in the operation of the safety cars during the past few weeks. The men, several of whom are former Detroit United Railway employees, are provided with uniforms similar to those worn by the Detroit City Firemen.

Chicago Traction Tangle Gets Worse

Resolution Before City Council Would Abrogate 1907 Ordinances—Mayor Informs B. J. Arnold Contracts Have Been Voided

The political squabble over the traction situation in Chicago is becoming more complicated. Realizing that the Mayor's plan for people's ownership and 5-cent fares will require several years to consummate, the local transportation committee started on some short-cuts to secure a 5-cent fare while waiting for people's ownership. It decided to recommend to the City Council that the traction ordinances be voted null and void. The Council postponed action on the resolution for one week.

THE court now has before it the question of whether or not the contract has been violated by the companies, but has not handed down its decision. Despite the fact that neither the court nor Council has acted, Mayor Thompson notified B. J. Arnold, chairman of the Board of Supervising Engineers, that the city has cancelled the contracts. At the same time the city is demanding that certain provisions of the contracts be rigidly enforced, so there is a good deal of anxiety as to where cancellation of the franchises would lead.

PROGRAM NOT CUMULATIVE

The 1907 ordinances provide that the companies shall build 23 miles of extensions each year, on order of the City Council. Under this provision, the companies have built 233 miles of track in thirteen years, or 17.9 miles a year. It was established some time ago that if it was a physical impossibility for the companies to build the full 23 miles in any one year, the requirement of the ordinance should not be cumulative.

This matter was recently brought to an issue by the insistence of various Aldermen that further line extensions be made. They were told by the law department of the city that in view of the controversy over the status of the ordinances, the companies would ignore any order of the City Council on any matter pertaining to rate of fare, service or extensions, and that they would have greater success in securing the extensions demanded if they would vote the present contracts abrogated and then appeal to the new public utilities commission for these extensions. Under this arrangement, the extensions which might be called for would not be limited to 23 miles in any one year and it is said that with the probability of a hand-picked commission, yet to be appointed, it is likely that orders would be issued favorable to the wishes of the city administration.

CONTRACTS DECLARED VOID

Consequently, the local transportation committee proceeded immediately, at the request of Chester E. Cleveland, special assistant corporation counsel on traction matters, to approve an ordinance declaring the contracts with the Chicago Surface Lines "cancelled, annulled, abrogated and terminated in their entirety because of the repudiation thereof and a refusal to keep, live up to and perform the same in essential particulars by the said companies."

The proposed ordinance also directs the city law department to proceed immediately under the public utilities act to request the commission for an order directing the surface lines to construct the extensions within a definite time limit. At this time Mr. Cleveland read a letter to the local transportation committee which Mayor Thompson had addressed a few days before to Mr. Arnold.

In this letter the Mayor informed Mr. Arnold that "The City of Chicago has elected to and has cancelled, annulled, abrogated and terminated said contract-ordinances in their entirety" because the various companies have repudiated the contract-ordinances in essential particulars. "Therefore, there is no authority under and by which said Board of Supervising Engineers can or does exist or act; and anyone pretending to act as a member of said Board will do so in violation of law."

Some of the members of the committee expressed a good deal of surprise as to when the cancellation took place, inasmuch as no formal action to this effect has been taken by the Council, the Circuit Court of Cook County in which the matter is pending, or the Illinois Public Utilities Commission. Mr. Cleveland, however, explained that the cancellation was just the gradual result of the repudiation of the contracts by the companies and that any definite date might be taken as the date of the filing of the city's bill in the Circuit Court requesting an actual cancellation order.

NO VIOLATIONS, SAY COMPANIES

The position taken by the companies is that there has been no violation of the contracts, since the Supreme Court of Illinois has held this to be the case, in upholding the orders of the Public Utilities Commission. If the city passes the ordinance abrogating the contracts and an order is secured from the commission for considerable extensions and improvements, it is probable that the companies will be forced to appeal to the courts because of their financial inability to carry out the order, and raising the question as to the reasonability of the proposed extensions.

While contending that the contracts are abrogated, Mr. Cleveland has been very insistent that the Board of Supervising Engineers should prevent the use of any money taken from the renewal and depreciation reserve fund created by the 1907 ordinances, for the purchase of new equipment in accord with a recent order of the Illinois commission. Some abstracts from a recent letter written to Mr. Cleveland by Mr. Arnold throw light on this dual situation. He writes:

> It seems to me that it is for the Board of Supervising Engineers to insist upon the terms of the ordinances except as they may be modified under the law as determined by the courts. While the law is being determined it is the duty of the board to respect all orders of the courts, or of the commission subject to the courts. taking such care as it legally can, however, that this shall be without prejudice to the rights of the public and of all the interests entrusted to the Board. The one thing that the board should not do, as it seems to me, is to furnish, by its failure to perform its duties, any justification whatever to the traction companies for claiming that they are thereby excused from complying with their obligations. I find myself unable to ignore the fact that nothwithstanding your confident assurance as to the ultimate establishment of your contentions (in the case before the Circuit Court of Cook County) the traction companies are in fact now operating under the ordinances, as modified by various orders of the State Public Utilities Commission, and claim the right to continue so to do.

In a letter to Mr. Arnold under date of Jan. 5, 1921, Mr. Cleveland stated that "assuming the ordinances still to be in force, we maintain that upon you, as chairman of the Board of Supervising Engineers, rests the positive duty of seeing to it that no part of the renewal and depreciation reserve fund is diverted to any purpose other than that for which it has been, or is, created under the ordinances."

EXPENSE ACCOUNT ASKED

After reminding Mr. Cleveland of what action had been taken by the Board to safeguard the proper uses of the surplus money of this fund, Mr. Arnold suggested to the city representative that he inform the chairman of the board how he can perform what Mr. Cleveland considers "the positive duty, etc.," in regard to the use of this fund, as noted above. Mr. Arnold continued:

> In particular I would like to have you inform me what steps, if any, you think I can take as chairman of the Board of Supervising Engineers, to prevent the companies from complying with the order of the commission with respect to the special equipment fund mentioned, and under what authority you think I could take such steps. Why don't you prevent them from doing this, while your litigation is pending? Are you not simply trying to shift to me the dilemma which really confronts you? If the ordinances are not in effect, how is the city now concerned with the renewal and depreciation reserve fund? If the ordinances are in effect, why does not the city enforcs its contract rights as to the maintenance and use of these funds? The Board of Supervising Engineers is merely certifying to the facts which the ordinances require it to certify; and it is safeguarding these certificates to the full limit of its ability. It permits no money to be paid out of the renewal and depreciation reserve funds for new cars, or any other expenditures that do not constitute renewals under the explicit provisions of the ordinances quoted in your letter."

For the second time in three weeks the City Council on Jan. 28 served Mayor Thompson's traction commission with a demand for an itemized report of its expenditures, which totaled $180,000. The report made by this commission was reviewed in the ELECTRIC RAILWAY JOURNAL for Jan. 15, page 150, and commented upon in the issue of Jan. 22, page 167. Several of the Aldermen expressed evident disapproval of the amount of money expended, considering the character of the report turned in. Besides asking for an itemized statement of expenditures, the Council order directs the commission to report its expenditures monthly hereafter. The commission still has $70,000 left in the fund appropriated for its use.

No Fraud in Seattle Deal—Rescinding Proposed

In its findings to the Superior Court regarding the $15,000,000 deal whereby the city of Seattle, Wash., acquired the railway lines of the Puget Sound Traction, Light & Power Company, the King County Grand Jury on Feb. 1 stated it found no evidence of corruption in connection with the matter but that the lines were worth only $5,000,000 at the time of purchase and that the city is entitled to equitable relief and the Council should take steps to obtain it. No indictments have been returned.

Mayor Caldwell's special investigator, Wilmon Tucker, in recommendations to the City Council concurred in by the Mayor, states that the traction company was guilty of constructive if not actual fraud with reference to the value of the property. He also states that the contract is impossible of performance and that the city is under no obligations to enhance the value of bonds issued by the city in payment of the railway by furnishing additional funds or security in an endeavor to carry out the contract.

Mr. Tucker advises that the city make an offer to rescind and tender back all property and ask for the return of the bonds, stating that if the tender is not accepted the city should bring action in equity to rescind the sale. He also says that if the Council will not agree to such action, the tax payers should institute legal proceedings to relieve them from unjust burdens.

Wages of Executives Cut in Cleveland

Wages and salaries of all officers and employees of the Cleveland (Ohio) Railway, with the exception of conductors and motormen, were reduced 10 per cent on Feb. 1. In the order announcing the reduction it was stated that "There will probably be a further reduction later on, unless conditions change materially." The 10 per cent reduction included the pay of John J. Stanley, president of the company, who has been getting $30,000 a year.

Wages of track repair laborers were reduced in an order issued on Jan. 3. Company officials announce that when the present wage agreement with the trainmen's union expires on May 1 the conductors and motormen will also have to accept a reduction of at least 10 per cent.

The men now get 75 cents an hour after the first year's service. Officials of the union have so far said nothing for publication regarding the proposed reduction, but have intimated that a strike is quite probable if the company attempts to carry out its announcement.

Governor Miller's Message Provokes Comment

New York Executive Removes Causes of Early Criticism in Talks to the Newspapers

Few purely local state papers have caused greater commotion in public and political circles than the message of Governor Miller of New York to the Legislature in regard to the public utilities. It has caused rifts in the ranks of Republicans. It has encouraged hope with the Democrats that they may again elect a Democratic Mayor in New York despite the incubus of the Hylan administration. It has been the subject of column after column of editorial comment.

MR. LA GUARDIA, the Republican President of the Board of Aldermen of New York, was stunned by the message. He interpreted the Governor's remarks to mean that all jurisdiction and control or say in traction matters would be taken from the City of New York except to put out money for new subways. He said that no matter what increased fares the surface lines obtained, they could not operate successfully. He characterized as flippant and entirely unbecoming the Governor's statement that there was a lot of loose talk about home rule.

"I KNOW HOW TO RUN THEM SUBWAYS"

NEW YORK "WORLD'S" REACTION TO MESSAGE

City Comptroller Craig characterized Mr. Miller's proposed solution of the fare question as a step backward fifty years. He said that the people of New York City would never tolerate the administration and control of an investment of approximately $400,000,000 of their own money in the subways by any public body or commission that was not directly responsible to the City of New York.

James J. Walker, Democratic leader in the Senate, looked upon the statements in the Governor's message as the alibi of the Interborough for an 8-cent fare. He said that the writer of the message was either the editor of the *Subway Sun* or the editor of the *Subway Sun* helped to write the message.

On the other hand Majority Leader Senator Lusk in answering Mr. Walker said that the Governor approached the problem courageously from the viewpoint of the man who wanted to accomplish something of practical benefit to the people. Assemblyman Simon Adler, majority leader, was also reported as saying that the Governor's message pointed out the way for the solution of the railway problem in the city of New York.

John H. Delaney, Transit Construction Commissioner, commenting on Governor Miller's message, said that only the outworn over-capitalized surface lines that are paralleled by the city-owned rapid transit line were drifting toward disaster. If the public did not patronize such lines after public money has been invested to provide better service there was no public obligation, according to Mr. Delaney, to provide dividends or speculative profits on the uncontrolled securities of such lines.

Frank Hedley, president of the Interborough, did not deem it proper for him to comment on the Governor's plan. On the other hand, Lindley M. Garrison, receiver of the Brooklyn Rapid Transit Company, said that it seemed to him that the only hope for a proper solution of the traction problem lay along the lines of the Governor's message. He said that the only opposition to the sound and sensibe method advocated by the Governor would come from those who sought personal and partisan interests rather than approved a just and proper solution of the matter. Later Mr. Hedley stated the case of the Interborough from the standpoint of the situation which now confronts that company and James L. Quackenbush, counsel for the company, prepared for the *Herald* a summary of the company's case from the point of view of law and equity.

EVENING "POST'S" IDEA WAS KILLING THE PATIENT WITH KINDNESS

On Jan. 25 Governor Miller amplified his message to the Legislature. He characterized as a state of mind verging on insanity the views of some legislators that they will only vote for the plan if it provides a fare not to exceed 5 cents and municipal control. He said that the fare question was only incidental. The real question was one of public service. The solution of the traction problem transcended the fare question. With regard to the claim that his recommendations usurped powers from the city, the Governor explained that the city never had power over public utilities except that delegated by the State. The interpretation was correct that his recommendations meant that, while he believed in municipal ownership as the ultimate solution, he did not believe in municipal operation. The Governor also explained that it was his purpose to appoint to the proposed new commission residents of New York City. He further elucidated his messsage by saying that the city should have representatives on the directorates of the corporations.

The *Times*, *Herald*, *Journal of Commerce*, *Commercial* and the *New York Tribune*, among the morning papers, are sympathetic with the message, although the *Tribune* is against the retention of a flat fare. The *World* and *American* oppose the Governor's message. The *World* does so, largely, because of the idea that the home rule principle would be violated and the *American* because of its avowed opposition to all corporation interests. Among the influential evening papers the *Post* was at first inclined to align itself against the Governor, but has since expressed the opinion that remarks made by the chief executive subsequent to the presentation of the formal message have done much to clear up some points in that document which it regarded as obscure.

The message was debated at a public meeting on Feb. 2 by Henry H. Curran, president of Manhattan; Job E. Hedges, receiver New York Railways; Oliver C. Semple, and Edward M. Bassett, respectively former assistant counsel and public service commissioner of the First District Commission. Mr. Curran conceded that the Governor is the only public official who has really tried to find a solution of the traction tangle. He approved the creation of a new state commission to get the facts and recommend remedies, but insisted that any changes in fares or contracts must be approved by the Board of Estimate. Such an investigation he believed would develop a plan based on a 5-cent fare, but if a square deal demanded an increase in fare the people must be shown.

Mr. Hedges defended the Miller plan. "The question," he argued "is whether a city administration vocally and visibly incompetent shall be left to the dickerings and bickerings which for three years have not advanced one single constructive thought on this subject." At the conclusion of his talk there was a demand by the audience for an extension of the time allowance. Mr. Hedges' address was replete with epigrams. Some of them follow: "Regulation presupposes something to regulate, but if nothing is done transit in New York soon will be only a memory." "Buses are only a temporary anæsthetic." "If I have been sick for three years and a New York doctor does nothing I feel I have a right to call in an Albany doctor who at least agrees to make a diagnosis." "The plea for home rule is like an alibi when your wife asks you where you have been last night and you don't remember."

Mr. Semple said that the state has power over all streets for the benefit of the public and held that the transit tangle should be taken up by business men. The Board of Estimate, he said, had acted like a lot of fellows who never had a real job in their lives.

Mr. Bassett held that there was not the seriousness in the situation today to demand state interference there was when the original subways were laid out.

Addresses were permitted from the floor and were about equally divided for and against the plan. The chief points made in opposition were that the capitalization of the companies included watered stock, higher fares would be a hardship to poor people and there should be home rule on the question.

Wage Cut in Cleveland

Railway There Makes Definite Announcement of 20 per Cent Decrease in Pay of Trainmen

A 20 per cent reduction in wages for all motormen and conductors, to take effect May 1, when the present wage agreement expires, was announced on Feb. 1 by George L. Radcliffe, vice-president and general manager of the Cleveland Railway. This means a cut from 75 cents to 60 cents an hour.

In addition to the proposed cut in wages, the company announces the discontinuance of special compensation agreements entered into after recommendations by the War Labor Board in 1918. These agreements provided for time and one-half for overtime, excess time for spread runs, eight-hour straight runs on Sunday, ten hours' pay for eight hours' work on night cars, etc.

The proposed reduction would save car riders in the neighborhood of $1,500,000 a year according to Traction Commissioner Fielder Sanders. Mr. Sanders said that if the reduction went into effect on May 1, it would be reasonable to expect decrease in fare after the wage decrease had been in effect long enough to increase the interest fund.

Fred Telschow, president of the local union said: "I have nothing to say until May 1." Identical comment was made by W. M. Rea, secretary of the union.

The bulletin which was issued by the company as a notice of the proposed cut follows:

> Effective on May 1, 1921, and continuing thereafter until further notice, there will be a reduction of fifteen (15) cents an hour in the wages of all motormen and conductors employed by this company.
>
> On that date the recommendations of the War Labor Board relative to time and one-half for overtime, excess time for spread runs, eight-hour straight runs on Sunday, ten hours' pay for eight hours' work on night cars, etc., which have been effective since July 31, 1918, will be discontinued.
>
> The minimum day of six (6) hours will remain as at present.

Approximately 3,400 motormen and conductors are employed by the company. The average monthly pay roll for 1920 was $555,324. Under a 20 per cent reduction the average monthly pay roll under similar conditions would amount to about $444,260. This would be an average monthly saving to car riders of $111,064.

Paul Wilson, assistant secretary of the company, said:

> The interest fund in December was $39,000. Revenue has been falling off rapidly. It is a case of either cutting expenses or cutting service. The service is not any more than adequate now. The company decided to cut expenses.
>
> The present fare of 6 cents is as high as it can be made without amending the Tayler grant. No one wants to see the fare go up if it can be reasonably kept down. Without amending the Tayler grant the interest fund would be wiped out and the city would lose regulatory control of the company.
>
> Wages of all other employees from the president down have been cut correspondingly, effective today. Wages of the motormen and conductors are fixed at their present scale until May 1 by agreement. It would be unfair to the rest of the employees if we did not reduce the wages of these 3,400 train men at that time.

The contract between the company and the union provides that once a year either party may submit proposed changes to the other. It also provides for arbitration in case of a dispute.

Wages of trainmen have increased from a maximum of 33 cents an hour in April, 1916, to 75 cents an hour at present. On May 1, 1916, the union signed a two-year contract with the company providing a maximum of 35 cents an hour, an increase of 5 cents.

In January, 1918, the company offered a voluntary increase of 6 cents an hour, which would have made the maximum wage 41 cents. This the union refused, and on May 1, 1918, it made a demand for 60 cents an hour. This the company refused and the men struck.

The War Labor Board arbitrated this strike after one hearing in Chicago and two in Washington and set the wage at a maximum of 48 cents an hour. The settlement was made in August, 1918, retroactive to May 1. The board at this time also made provisions of time and a half for overtime and recommended special compensation, etc.

In May, 1919, the union did not ask for an increase in wages. There had been a temporary slump in business conditions for a few months following the armistice. In June, 1919, following an increase granted to workers on the Detroit United Railway the Cleveland union demanded a raise. After a strike of three days Governor H. L. Davis, then Mayor of Cleveland, offered his services and settled the dispute, the company granting the men a raise to 60 cents after City Council had promised the company to increase the dividend rate from 6 to 7 per cent. The dividend increase, after being authorized by Council, went to a referendum vote of the citizens and was rejected.

In May, 1920, the men demanded an increase to $1 an hour. Mayor W. S. Fitzgerald tendered his services in the dispute which followed this demand, and the men accepted an increase to 75 cents.

Strike Follows Reduction in Wages

Trainmen in the employ of the United Traction Company, Albany, N. Y., went on strike on Jan. 29 in protest against the reduction in wages announced by the company. As noted in the ELECTRIC RAILWAY JOURNAL for Jan. 29, pages 235 and 244, the United Traction Company has just received permission to charge an 8-cent fare in Albany, but the Public Service Commission denied the company's right to do so in Troy, where there is a provision in the charter which prevents an increase. Several days ago the company notified its men that the cut in wages would be effective with the putting into effect of the increased fare in Albany, although in Rensselaer the city fare is cut down to 5 cents, where it has been 7 cents heretofore. In Troy the union men voted to a man to strike to retain the 60-cent an hour schedule of pay and the Albany union followed a night or two later. The Public Service Commission of the Second District of New York has issued an order requiring the company to appear before it and show cause why service is not at present operating.

News Notes

Newspaper Runs Series on Railway Problem. — The Grand Rapids *News* is running a series of articles on the transportation problems affecting Grand Rapids. The *News* has called upon city officials and others who have made a study of the bus question to express their views so the public may benefit thereby. One article written by City Commissioner Shaw outlined in detail the service-at-cost plan now under consideration by the City Commission. This proposal was reviewed in the ELECTRIC RAILWAY JOURNAL for Jan. 29.

Homes Ready for Employees.—Work on the construction of bungalows under the employees' housing program outlined by the Los Angeles (Cal.) Railway is nearing completion, and it is expected that they will be available for use at an early date. In the Jan. 10 issue of *Two Bells*, the official publication of the Los Angeles Railway, it states that so far sixty families have been accommodated under this housing plan. In the majority of these instances the employees have had a home selected and the railway has financed the purchase.

Wage Question Discussed in Brooklyn.—The question of wages in the future has been discussed in a general way by the management of the Brooklyn (N. Y.) Rapid Transit Company with the employees' representatives and the representatives were told that there was no suggestion at this time of an immediate reduction in wages by the company. The entire matter was discussed informally and in a general way, and amounted to nothing more than an interchange of views on the question of wage readjustments throughout the country.

Electrification Being Considered.—George W. Lee, chairman of the operating board, states that the Ontario Government is seriously considering the electrification of the Temiskaming & Northern Ontario Railway. Reports secured from experts show the cost would be about $9,000,000, but the results would warrant the expenditure. One of the main benefits would be the making of the line self-sustaining in regard to motive power, through eliminating the necessity of the heavy importation of coal. The road is more than 300 miles long.

Trackless Trolley for Erie.—A. R. Myers, general manager of the Buffalo & Lake Erie Traction Company, has agreed to apply to the city authorities of Erie, Pa., for a franchise to operate a trackless trolley upon certain streets of the city. It was declared at the conference between representatives of the railway and the municipal authorities of Erie that the General Electric Company now is experimenting upon the car at its Schenectady plant and that as soon as negotiations can be completed several of the cars will be brought to Erie. It is proposed to try out the system in Liberty Boulevard between Second and Thirty-second Streets.

Track Being Torn Up in Blue Island.—The Chicago & Interurban Traction Company is tearing up 1 mile of single track on Canal Street, Blue Island, Ill., extending from the main line at Western Avenue to Calumet Grove. This line was built to serve the picnic grounds at Calumet Grove, at one time a very popular place. In recent years, however, the only business done by the company on the line to the park was on Sundays in the summer. A twenty-minute service has been given seven days a week, using one car. The annual loss on operation was about $8,000. Permission to discontinue service and dismantle the line was granted by the Illinois Public Utilities Commission just before the close of the year 1920.

Chicago Newspapers Raise Pertinent Question.—In the controversy in Chicago and Illinois over the abolition of the Public Utilities Commission and the restoration of 5-cent fares two Chicago newspapers have raised a very pertinent question. They point out that the campaign fight was waged on the platform that Governor Lowden's commission was wrong in raising fares above 5 cents. But if it was wrong, they now ask, why does not Governor Small's commission order the fares reduced to 5 cents as soon as the appointments are made. They say that this would be a very speedy way to restore 5-cent fares while it may take several years to complete the Mayor's plan for a people's ownership and a 5-cent fare.

Transportation Difficulties in California.—A recent issue of the San Francisco *Chronicle* forecasts trouble in the present California Legislature between railway and motor transport interests. H. C. Donoho, the writer of the article, states that the fight will center about efforts to impose additional taxes on auto stages and motor trucks. How extensively the auto as a facility in transportation has progressed in California is shown in a photo which accompanies the account. It is a view of the Los Angeles passenger depot for auto stages where 600 buses each day arrive and leave for points as far north as San Francisco and as far south as El Centro. All steam railroads and electric interurban lines operating in California openly advocate legislative measures that will put an end to all unfair transportation competition.

A Penny a Day to Keep Poverty Away.—Employees of the Toledo Railways & Light Company, Toledo, Ohio, have evolved a plan to help many of their fellow workers put on short time or laid off during the period when closed factories have caused a decrease in both power and railway service. The workers have agreed to donate 1 cent out of each dollar they receive into a fund to be administered by a committee of both employees and officers and the company agrees to match the money of the men. With a monthly payroll of nearly $300,000 this will give a fund of $6,000 a month for the support of men whose families are in need. Very few cases of need have arisen in the ranks of the rail-light employees, but the fund is started in order to prevent any of the men from appealing to the city for help. The city has opened centers for the free distribution of food.

A New Offer to Miami.—Attorney Crate D. Bowen, representing the Miami (Fla.) Traction Company, which has not been operating since the fire which destroyed its powerhouse last fall, appeared before the City Council and suggested that the city consider the possibility of purchasing the rails, equipment and franchise of the company. The Council did not take any action, in fact the attorney did not ask any, merely suggesting consideration of such a proposition, but many hold that the company has forfeited franchise rights and that all the city should buy is the rails and equipment. The need for railway service is stressed by business men everywhere. The jitneys that have sprung up are inadequate and unsatisfactory. No action will be taken, it is believed (since the voting in of a commission form of government) until the new government is framed and the new commissioners come into power. Mention of this prospective sale was made in the ELECTRIC RAILWAY JOURNAL, issue of Jan. 1.

Financial and Corporate

Preferred Dividends Paid

Washington Railway & Electric Company Shows Improved Earnings Under 8-Cent Fare

The report of the president to the stockholders of the Washington Railway & Electric Company, Washington, D.C., covering the operations of that company and its subsidiaries for the year 1920, reviews the fare situation. On Jan. 6, 1920, the company petitioned the Public Utilities Commission of the District of Columbia for a further increase in fare from 7 cents cash with four tickets for 25 cents, the rate then prevailing. This petition was not acted upon until April 15, but relief was granted effective May 1. The 7-cent cash fare was increased to 8 cents and the ticket rate of four rides for 25 cents was made four rides for 30 cents.

NEW RATES HELP COMPANY

Under the new rates the financial condition of the company improved so that it was possible on Aug. 20 to pay the cumulative dividend of 2.5 per cent due on the preferred stock for the period Dec. 1, 1919, to June 1, 1920. On Dec. 1, 1920, the preferred dividends for the six months just then ended were also paid, thus paying in full to date all preferred dividends due. No dividends, however, were paid on the common stock during the year.

The better showing made, of course, is due largely to the higher rate of fare effective May 1, last. It is also due, in a considerable degree, to increased efficiency and operating economies, for early in the year certain lines were rerouted. This not only saved in car mileage but greatly reduced the congestion at some of the most important loading points, thereby permitting a more regular and expeditious movement of cars. The company has also proceeded in a small way with the operation of one-man safety cars, a type of car which seems to be well adapted to operation on some of the lines.

It is also proceeding with the conversion of open cars to modern trailer cars of the general appearance of the most recent equipment purchased. The operation of such trains is proving economical and will be further tried out during the coming year.

There has also been a considerable improvement in the accident situation. During the year the number of accidents was reduced 22 per cent and the number of claims presented was reduced 30 per cent.

During the year 2.65 miles or 4.2 per cent of underground trolley trackage was rebuilt. The largest job was on the Connecticut Avenue line extending from Dupont Circle to Eighteenth and Columbia Road. The cost of such reconstruction work was at the rate of approximately $134,000 per mile of single track. This is 2.5 to 3 times more than the pre-war cost of similar work.

The total amount spent for maintenance and improvement of way and structures was $1,136,277. During the year 112,913,416 passengers were carried, of whom 25,130,632 were handled on transfers. As compared with the previous year, the number of revenue passengers decreased 4,408,575 or 4.78 per cent.

Refunding Provision Proposed

A bill has been introduced in the present session of the Legislature at Olympia, Wash., by Senator Fred W. Hastings of King County providing for the refunding of utility bonds. The measure says:

> Sec. 1. Cities and towns are hereby authorized to refund public utility bonds issued according to law in such manner, for such time and upon such terms and rates of interest as the legislative authority of such city or town may deem advisable. The rate of interest upon such refunding bonds shall not, however, exceed the maximum rate authorized by law at the time of such redemption for utility bonds, and where said bonds so refunded constitute a general obligation of such city or town, said refunding bonds shall not be deemed the creation of a new or an additional indebtedness of such city or town.

Mayor Hugh M. Caldwell is opposed to the passage of any such measure. He states that it would enhance the value of the $15,000,000 of bonds issued by the city for the purchase of the local railway from the Puget Sound Traction, Light & Power Company by making it possible for the city to pay the principal from some source other than the earnings of the road.

Mayor Caldwell in session with members of the City Council finally succeeded in having it agreed to recommend that a provision be written into the bill that bonds issued prior to passage of the act should not be so refunded. This would eliminate the railway bond issue.

Assistant Corporation Counsel Evans, in discussing the bill, said:

> The bill was prepared so as to permit the city of Seattle to refund any installment of the special fund railway bonds at maturity that it may not be able to meet from the earnings of the system. The outstanding bonds would be surrendered for cancellation and new special fund utility bonds can be issued to replace them. The terms of the new bonds may be fixed by the City Council, except that they will have to be made payable solely from the earnings of the street cars.
>
> The refunding bonds would not constitute a general obligation any more than in my judgment do the existing bonds. The bill if passed would have the effect of permitting the city a longer time in which to meet the purchase price of the street car system should that be found necessary. These refunding bonds would bear an attractive interest rate and would be sold if necessary on the open market.

Default Narrowly Averted

Financial Difficulties of Company at Albany Due to Cost Increase Compared with Income

The intercorporate relations of the United Traction Company, Albany, N. Y., the Hudson Valley Railway and the Delaware & Hudson Company received considerable attention at the hands of the Public Service Commission for the Second District of New York in the decision by that body on Jan. 21 in the matter of fares, referred to at length in the ELECTRIC RAILWAY JOURNAL for Jan. 29.

The commission says that in view of the financial condition of the Hudson Valley Railway there has been during the whole period since the Hudson Valley securities were acquired a strong possibility that much of the indebtedness of that company will never be paid. The process of one company borrowing from the other is characterized as a movement in a circle: The Hudson Valley Railway borrowed money from the United Traction Company to meet its obligations, including interest due that company; the traction company in turn used the interest received from the Hudson Valley to pay dividends on stock owned by the Delaware & Hudson Company and then borrowed from the Delaware & Hudson Company to loan to the Hudson Valley Company.

The commission says, however, that from any evidence at hand the conclusion is inescapable that the United Traction Company's present troubles, while they may have been somewhat aggravated by improper or mistaken management in the past, are fundamentally due to an increase in operating costs out of all proportion to the increase in revenue from passenger traffic.

In referring to the purchase of the Hudson Valley Railway by the United Traction Company the commission said:

> The most that can be said therefore, of the Hudson Valley purchase as affecting the United Traction Company's financial condition today is that if the Hudson Valley purchase had not been made and the traction company had continued to pay dividends only at the old rate on the old capital stock the traction company would be not quite so far behind, but would be in just exactly as much need as it is today of increased revenue to meet current costs of operation.
>
> Of course, if the Hudson Valley Company failed to meet its obligations and the Delaware & Hudson Company should try to collect its loans from the United Traction Company, that would be a different story, but the facts are so clear that there is not the slightest prospect that the Delaware & Hudson Company could make the United Traction Company riders pay the Hudson Valley losses in any such fashion. It is fair to say that there is no evidence of any attempt by the company to charge Hudson Valley losses directly or indirectly to United Traction operations. The difference between the increase during 1918 in loans from the United Traction Company to the Hudson Valley Company, $1,841,093, and the increase in loans from the Delaware & Hudson Company to the United Traction Company, $2,132,241, is $291,149 which is about offset by the increase in "construction work in progress," $149,532, and in corporate deficit, $132,734. Those two items together amount to $282,266. In other words, the Delaware & Hudson Company may be said to have financed the traction company's maintenance work and its net losses, in addition to carrying the Hudson Valley.

Merger Proposed

Interstate Public Service Proposes to Take Over Louisville & Southern Indiana Traction Company

Stockholders of the Louisville & Southern Indian Traction Company will meet in Indianapolis, Ind., shortly, to consider and vote on a proposal to ratify the action of the company directors in entering into a contract for the sale of all the property and assets of the company to the Interstate Public Service Company. Stockholders of the Louisville & Northern Railway & Lighting Company will take similar action. The Interstate company, it is understood, owns a majority of the stock in the other two companies, either directly or through its officers and directors.

The Louisville & Southern Indiana Company took over the property of the Rapid Transit Company, organized twenty years ago, to build an interurban road between Jeffersonville and New Albany, Ind. Later the Louisville & Southern Indiana obtained entrance into Louisville by way of the Big Four bridge at Jeffersonville, building approaches on each side of the river. Then the Louisville & Northern company was organized and built lines out to Charlestown and Sellersburg. At the latter city it connected with the Indianapolis & Louisville Traction Company, which built south from Seymour, where it connected with the Indianapolis, Columbus & Southern, the pioneer interurban of Indiana. The Louisville & Northern also obtained entrance into Louisville bridge by way of the Kentucky & Indiana bridge at New Albany.

The Interstate Public Service Company was organized later as a holding company. Besides the two interurbans, it has bought the Indianapolis & Louisville and leased the Indianapolis, Columbus & Southern for a long period, giving unified service between these cities and Indianapolis. The company owns a water power plant at Williams, Lawrence County, and soon will obtain power from a hydro-electric plant at Keokuk, Ia. It owns the controlling interest in the United Gas & Electric Company, supplying Jeffersonville, New Albany and Corydon, Ind., with gas and electricity, and also owns public utility plants in many other towns of Southern Ind. Harry Reid, president of the company, is moving from Louisville to Indianapolis, the headquarters of the company.

New Officers for Interurban

F. E. Myers, Ashland, who has been president of the Cleveland, Southwestern & Columbus Railway, Willoughby, Ohio, for many years, has resigned to give practically his entire attention to his business at Ashland, including the Ashland Pump & Hay Tool Works and the Faultless Rubber Company, while four prominent Cleveland bankers have been elected to the board of directors.

The reorganized directorate consists of F. E. Myers, chairman; Warren Bicknell, who represents the Union Trust Company; L. J. Wolf, P. A. Myers, E. B. Greene, vice-president the Cleveland Trust Company; Judge W. B. Thompson of Lorain; Otto Miller of Hayden, Miller & Company; H. C. Robinson, vice-president of the Guardian Savings & Trust Company; J. O. Wilson, F. L. Fuller, F. T. Pomeroy, L. M. Coe, North Olmsted; W. E. Haines, secretary of the Ohio Farmers' Insurance Company of Le Roy, and E. F. Schneider.

The directors elected L. J. Wolf, first vice-president; J. O. Wilson, second vice-president and treasurer, and F. T. Pomeroy, third vice-president and secretary. A committee was appointed to elect a president and a report is expected within a few days.

Members of the executive committee are Warren Bicknell, L. J. Wolf and F. T. Pomeroy with F. E. Myers, chairman of the board, and the president when elected as ex-officio members.

I. R. T. Fails to Earn Cost of Service

The comparative income statement of the Interborough Rapid Transit Company for the month of December, 1920, shows a deficit of $301,403. Compared with the deficit of a year ago this figure is alarming. If this be true of the one-month showing it is doubly alarming in the six months' statement. Since July, 1920, operations show a loss of $2,682,760 which is a greater figure than shown in the report of the company for the fiscal year ended June 30 last. At that time the deficit was recorded as $2,235,835. Although the gross operating revenues have increased during the last six months the steady rise in operating expenses has offset this increase by 7 per cent.

City Would Audit Books at New Orleans

Paul Malony, Commissioner of Public Utilities of the city of New Orleans, has asked an audit of the books of the New Orleans Railway & Light Company, and to this end has requested Gov. John M. Parker to assign the state auditor of public accounts to the task.

The purpose of the audit is to give the public and the city some information about the disposition of the 2 extra cents, in the 8-cent fare which the company was permitted to charge for a period of six months ending in April, with the explicit stipulation that the 2 cents were to go to the payment of wages and taxes.

The railway is now deliquent in both the city and state taxes for 1920. Its failure to pay the city taxes of $600,000, on the grounds that it did not have the money is the reason given by the city for the step to be taken to examine the books.

$8,439,400 of Securities Sold by Utility to Its Customers in 1920

Complete figures of the local or customer-ownership sales of securities at the properties of Standard Gas & Electric Company Chicago, Ill., during 1920 show a total par value of $8,439,400 thus distributed. Of this amount $6,343,050 was represented by the preferred stocks of the various subsidiaries and $2,096,350 by round notes and other securities of Byllesby companies. Preferred stock sales were much greater than during any year since the customer-ownership plan of financing was inaugurated. About 25 per cent of the investors in such securities were purchased on the partial payment plan.

SUMMARY OF EARNINGS OF INTERBOROUGH RAPID TRANSIT COMPANY

Month Ended Dec. 31	1920	1919	Percentage Change Over 1919
Gross operating revenue	$4,980,072	$4,668,268	6.7
Operating expenses	3,235,854	2,855,951	13.3
Net operating revenue	$1,744,218	$1,812,317	—3.8
Total taxes	220,831	228,556	—3.4
Income from operation	$1,523,387	$1,583,761	—3.8
Non-operating income	56,093	53,988	3.9
Gross income	$1,579,480	$1,637,749	—3.6
Interest, rentals, etc., including Manhattan guarantee	1,880,883	1,659,919	13.3
Net corporate income (exclusive of accruals under the provisions of Contract No. 3 and related Certificates which under these agreements with the City are payable from future earnings	*$301,403	*$22,170	—1260.1
Operating ratio (per cent)	65.0	61.2	3.8
Passengers carried (revenue)	90,522,590	84,771,977	6.8

Six Months Ended Dec. 31	1920	1919	Percentage Change Over 1919
Gross operating revenue	$26,969,396	$24,200,226	11.4
Operating expenses	18,034,299	15,175,220	18.9
Net operating revenue	$8,935,097	$9,025,006	— 1.0
Total taxes	1,311,268	1,297,516	1.1
Income from operation	$7,623,828	$7,727,489	— 1.3
Non-operating income	316,253	271,929	16.3
Gross income	$7,940,082	$7,999,419	— 0.7
Interest, rentals, etc., including Manhattan guarantee	10,622,842	9,919,785	7.1
Net corporate income (exclusive of accruals under the provisions of Contract No. 3 and related Certificates which under these agreements with the City are payable from future earnings	*$2,682,760	*$1,920,366	—39.7
Operating ratio (per cent)	66.9	62.7	4.2
Passengers carried (revenue)	496,595,522	445,396,934	11.5

* Deficit.

Ohio Electric Collateral Sold for $25,000

A lot of securities including collateral notes, coupons overdue and bonds and stocks of the Ohio Electric Railway and bonds of the Columbus Interurban Terminal Company and the Columbus, Newark & Zanesville Electric Railway and all equity in collateral pledged by the Ohio syndicate was sold at auction at Philadelphia, Pa., on Jan. 12 for $25,000.

Letters were received on Jan. 7 by members of the participating syndicate in the Ohio Electric Railway system advising them that the securities owned by the syndicate would be sold at auction on Jan. 12. The collateral was sold to raise funds to pay off the indebtedness of the syndicate, the securities having been put up as collateral against the notes of the syndicate.

It is understood that the indebtedness of the syndicate is about $3,500,000.

The letters notifying the syndicate members of the proposed sale came from Erwin & Company, Philadelphia, the syndicate managers.

Financial News Notes

$11,215 Lost at Henderson.—In the annual report to the Common Council of the city of Henderson the Henderson (Ky.) Traction Company reports a loss of $11,215 for the year 1920. The present far is 7 cents, with four tickets for 25 cents. The company asks in its report some method of relief in order to operate.

Preferred Stock Quickly Sold.—The syndicate of banking houses headed by Nesbitt, Thomson & Company, which took the issue of $3,000,000 of 7 per cent cumulative preferred stock of the Winnipeg (Man.) Electric Railway, have announced the closing of the subscription lists. This is the first large public utility issue sold in Canada since the war.

Discontinuance of Puyallup Line Allowed.—By order of the Public Service Commission the Puget Sound Electric Railway, Tacoma, Wash., is permitted to discontinue service on the old Puyallup line from Summit to Fruitland. It is stated that revenues on the line during the trial period of three months ended Dec. 31 were only $141.11, as against expenses of $499.10, exclusive of depreciation.

Earnings Increase Under Eight-Cent Fare.—The revenue of the New Orleans Railway & Light Company, New Orleans, La., under the 8-cent fare for the months of October, November and December increased $321,000. Increases in wages for the same period were approximately $42,000. The number of passengers during this interval fell off monthly about 7 per cent. A complete survey of the company's earnings now being made will soon be ready for submission to Commissioner Maloney.

Increase in Capital Asked.—The Bristol & Plainville Tramway, operating about 15 miles of electric railway in Bristol, Plainville and Terryville, Conn., and supplying industries with electric power, has petitioned the State Legislature for permission to increase its capital stock from $1,000,000 to $5,000,000. The additional capital will provide for business expansion as conditions warrant it, especially for the distribution of electric power. Not all the proposed increase will be used at once.

Property Sold For Taxes.—Harry Reinhard, North Adams, Mass., a real estate and insurance dealer, was the purchaser of real estate owned by the Berkshire Street Railway in Williamstown at public auction for $1,475. The sale was held to satisfy unpaid taxes for the past three years, totaling $1,216.39. The sale of personal property owned by the company in Williamstown was postponed. Mr. Reinhard purchased the Hoosac Valley park property of the Berkshire company at a tax auction sale held on Aug. 21 last.

Franchise Declared Forfeited.—The Board of Estimate of New York City has declared forfeited the franchise of New York & North Shore Traction Company, which formerly operated on the north shore of Long Island in the Borough of Queens. The franchises were forfeited on the ground that the company ceased operation of the lines last May, and also owes the city a large sum of money for franchise taxes. The company is now in the hands of receivers, appointed by Judge Chatfield of the Federal court in Brooklyn.

Citizens Plan to Continue Line.—The Stoughton Railway Corporation, operating between Stoughton and Randolph, Mass., which was to have discontinued service on Jan. 22, has been taken over by business men in the vicinity of Randolph and Stoughton and operation of cars is assured. The holder of the mortgage on the property was the highest bidder for the equipment at foreclosure. Temporary officers have been elected. The line was formerly known as the Norfolk & Bristol Street Railway, a Massachusetts corporation, which was sold at public auction on Oct. 23 last.

Effort Made to Amend Valuation Act.—Senator Mackay has introduced a bill in the New Jersey Legislature providing for a court of review of the valuation of the electric railways that are being appraised under an act of last year. That measure placed these valuation under control of a special commission independent of the utilities board. This commission consists of the Governor, the State Comptroller and the State Treasurer, but Governor Edwards, declaring the act was a political measure, refused to serve and State Comptroller N. A. K. Bugbee and State Treasurer William T. Read are acting as the commission.

A Finite Court.—Some elementary facts in regard to the methods of foreclosure and sale and the winding up of receivership are stated by Judge Julius M. Mayer of the Federal court at New York in answer to Senator Harris of Brooklyn. Legislators of that borough recently decided among themselves that it was about time the receivership of the Brooklyn Rapid Transit Company was ended and sought to confer with the court about the matter. The court explained that there was a multiplicity of claims against the company; that the only thing the court could do to hasten the time for ending the receivership was to dispose of all matters ready for its consideration; that it was doing this, and that "I cannot, therefore answer your query any more definitely." An inquiry into the affairs of the company by Congress has since been proposed.

Removing Prohibition to Merger.—By a vote of thirteen to one on Jan. 26 the District of Columbia Committee of the House of Representatives instructed Representative Gould, New York, to draft and report favorably to the House a bill removing the statutory prohibition against the consolidation of the Washington Railway & Electric Company and the Potomac Electric Power Company. A committee of five was also authorized to draw up a bill looking toward the merger of the Washington Railway & Electric Company and the Capital Traction Company. It was pointed out that it would be unfair to the Capital Traction Company to ask it to put its property into the pool if the Washington Railway & Electric Company were allowed to hold out of the merger its most valuable asset, the Potomac Electric Power Company.

Personal Claimants Question Validity of Bonds.—Charges that the first and second mortgage bonds of the Kansas City (Mo.) Railways, amounting to $32,903,000, are invalid and void because they were issued in violation of a constitutional statute of the state, which prohibits a mortgaged indebtedness in excess of the capital stock, have been made in an answering petition filed in the United States district clerk's office by sixty-two personal injury claimants of the railway. The petition was filed by Harry G. Kyle, attorney for personal injury claimants. It was in answer to the intervening petition and bill to foreclose filed two months ago, following the admission of insolvency of the railway by the Continental & Commerce Trust & Savings Bank and Edward F. Swinney, trustee.

Traffic and Transportation

Would Restrain City

Louisville Railway Seeks Injunction to Prevent Interference with Increase in Fare to 7 Cents

The Louisville (Ky.) Railway on Jan. 27 filed with the United States District Court at Louisville a petition for an injunction to restrain the city authorities from interfering with the collection by the company of a 7-cent fare. This action followed closely the rejection by the City Council of an ordinance granting the railway an increase in rates. If the injunction is granted the company states its intention immediately to begin charging the 7-cent fare, with free transfers. The fare is now 5 cents.

DEMAND SUIT BE SPEEDED

Efforts are being made by representatives of both the city and the railway to have the suit heard as soon as possible by Federal Judge Walter Evans. Mayor Smith personally has favored the increase in fare, and has so stated in the press. However, the City Council has refused to grant the increase, although the Board of Aldermen has voted in favor of it. The Board of Trade and a number of civic organizations favored the higher-fare plan. Sixty-odd labor union locals and a number of welfare and suburban organizations opposed it.

James P. Barnes, president of the railway, outlined the attitude of the management as follows:

> The officers and directors of the Louisville Railway believe that company to be under a three-fold obligation:
>
> First—To render adequate service to the public of Louisville.
>
> Second—To maintain an adequate living wage scale for its employees.
>
> Third—To pay a reasonable rate of return to the investors in securities upon the amount invested in property used in the service of the company.
>
> We believe also that the company has the right to command means of carrying out these obligations by a sufficient charge for service rendered. In this belief the company is seeking relief in the federal courts under that clause of the United States Constitution which insures to the citizens of this country that their property shall not be taken from them without due process of law. At the present time the net earnings on the investment in the property of the Louisville Railway are less than 3½ per cent per annum, which is far below the legal interest rate and which in recent court decisions has been held confiscatory.
>
> #### COURT ONLY RECOURSE LEFT
>
> In the month of December an advertisement was published over the signature of the president of this company announcing that one of two courses must be followed—etiher relief or retrenchment. Relief through the city's co-operation was refused by the rejection in the Board of Councilmen of the Wilson ordinance. We are, therefore, faced with the alternative of seeking relief through the courts or at once entering upon a program of retrenchment.
>
> We have chosen the alternative of seeking relief through the courts in order that the public may be spared the inconvenience and annoyance incident to curtailment of service which would otherwise be necessary.

The grounds given for asking for the injunction is that the operation of the car lines in Louisville under a 5-cent fare franchise does not yield sufficient revenue to meet the expenses of the company.

The railway company also sets forth claims that the rate-making power still exists in the city and contends that it is entitled to the reasonable exercise of this power, which again does not extend to the point of confiscation. In its petition the plaintiff traces out the legal and corporate history of the street car enterprise in Louisville. Specifically, the plaintiff claims it is operating under two classes of franchises, those granted to it direct by the city of Louisville and those purchased by it from the various street car companies that formerly operated in Louisville.

The Mayor at first refused to comment on the city's action. The city attorney on the other hand indicated that he would have a statement to make as soon as the suit was filed by the company.

Fast Through Service Between Indianapolis and Fort Wayne

At a conference of officials of the Union Traction Company of Indiana and the Indiana Service Corporation at Muncie recently it was decided to establish three new trains between Fort Wayne and Indianapolis. This fast through service via Anderson and Peru was inaugurated on Jan. 16. Through the newspapers the public was invited to submit names for the new trains, but on Jan. 15 no selection had been made, though probably a hundred names had been submitted.

Two trains will be operated through Muncie and the third by way of Peru. The first of the new trains will leave Fort Wayne at 6:30 a.m. and will arrive in Muncie at 8:30 o'clock and in Indianapolis at 10:15. On the return trip it will leave Indianapolis at 5 p.m., arriving in Fort Wayne at 9 p.m.

The second train will leave Indianapolis at 7 a.m. and arrive at 11:10 a.m. in Fort Wayne. On the return trip it will leave Fort Wayne at 5:30 p.m., reaching Indianapolis at 9:30 p.m. These trains will make only county seat stops.

The third train, which now leaves Indianapolis at 7 o'clock in the morning and is run to Bluffton, will go to Fort Wayne, arriving there at 11:50 a.m. The car will leave Fort Wayne at noon and arrive in Indianapolis at 4:15 p.m. This car will be operated on regular limited time.

The Union Traction Company of Indiana and the Indiana Service Corporation are jointly inaugurating this service to compete with the service of the steam railroads between Indianapolis and Fort Wayne.

Joint Use Ordered

Commission Order Expected to Relieve Congestion in Milwaukee—Rentals a Problem

The Wisconsin Railroad Commission has directed the joint use of tracks on Wells Street in the City of Milwaukee by the Milwaukee Electric Railway & Light Company, the Milwaukee Northern Railway and the Chicago, North Shore & Milwaukee Railroad. The commission retains jurisdiction and will settle the compensation to be paid by the companies for the use of the tracks. Thirty days are given to appeal.

The order is expected to permit the routing of one or more of the lines of the Milwaukee Electric Railway & Light Company over Wells Street below Eleventh Street, thus relieving traffic congestion on Grand Avenue and its continuation, Wisconsin Street, the main business street of the city. Wells Street parallels Grand Avenue.

The Railroad Commission's order is similar to the one it issued on Dec. 1, 1913 (13 W. R. C. R. 268, 299). At the time, however, it embodied in it a provision under which the companies concerned were authorized to examine each other's books and records for the purpose of verifying the accuracy of statements rendered or claims made pursuant to the terms of the agreement. This provision resulted in prolonged litigation. Finally, some months ago, the courts held that the commission had exceeded its powers in that respect. The commission thereupon once more considered the matter and issued the present order. The new order omits that portion of the previous order relating to the examination of books and records.

When the matter was under consideration in 1913 the Milwaukee Electric Railway & Light Company was granted permission by the City Council to extend its tracks on Wells Street from Eleventh Street down. This was done at a considerable expense, but because of the ensuing litigation the tracks have lain idle ever since. Between Sixth and Second Streets on Wells Street there are tracks of the Milwaukee Northern and the Chicago, North Shore & Milwaukee roads.

Mayor Hoan of Milwaukee has urged upon the Railroad Commission the need of withdrawing some of the railway traffic from Grand Avenue and from Wisconsin Street, pointing out that, due in a large measure to the increased use of automobiles, congestion on this thoroughfare has been greatly intensified within the past few years until it has become a constant menace to life and limb.

The Railroad Commission is asked to enter an order for the proposed rerouting. Immediate rerouting of street cars is also urged in a letter to the Railroad Commission by the Milwaukee Safety Commission. On the other hand, Grand Avenue merchants, who opposed taking cars off Grand Avenue when the matter was considered some years ago, are expected to take the same stand at this time.

Flexible Fares Criticised

City Club of New York Opposed to Flexible Rate of Fare Dependent on Cost of Service

The City Club of New York has issued a comprehensive report on flexible fares for street railways. This report, which represents an exhaustive study of the flexible fare idea by the club's committee on public service, points out that Governor Miller's traction program, while it calls for a uniform fare throughout the city at any given time, is based upon the idea that the fare will fluctuate from time to time according to the cost of the service.

THE report traces the spread of the service-at-cost idea in recent years as a means of giving relief to hard-pressed traction companies in many cities. It declares that flexible fares cannot be applied in any community except where all traction lines are combined and operated as a unit and that the thirty-five operating companies and receiverships in New York City create a competitive condition that makes the flexible fare plan impossible.

For example if the fare on the surface lines was more than on the subway competition would immediately assume much importance and subway traffic would be increased at the expense of the surface lines. The non-paying surface lines would be worse off by the very fare increases destined for their relief. The same would be true if the B. R. T. subways charged one rate of fare and the Interborough another. The report says that such a consolidation could not be effected by voluntary agreement except at a prohibitive cost. No group of security holders will consent to give up the advantages they hold, and so a voluntary consolidation would have to be based on giving every group whatever it asks as the price of its consent to go into the combination.

FLEXIBLE FARE OPPOSED

The report says that the Governor's proposed commission will be in a position to surrender public rights only. It will not be able to bring about a surrender of private rights except by negotiations and persuasion.

Even if all the transit lines could be consolidated, the adoption of the flexible fare scheme would involve issues of grave moment to the city, says the report. One of these, is the question of the social importance of cheap transit. The city's policy, as embodied in the subway contracts, included low fares as a means of spreading out population and relieving conditions from which New York has suffered for more than half a century. The city has already pledged hundreds of millions of dollars to the maintenance of this policy. The flexible fare scheme would reverse it, and would allow the fares to be increased to any point which might be necessary to make the transit lines self-sustaining regardless of the effect of the high fares on the community's welfare. The flexible fare scheme would make fare-fixing a fiscal matter pure and simple, and divorce it entirely from any general consideration of municipal policy with respect to community development. Under such a plan the railway companies would be entirely relieved of their obligation to provide the service at reasonable rates to the public; they would lose their character as public utilities and become private enterprises privileged to use the streets to exploit for private gain the transportation needs of the public up to the full amount of the return upon the investment fixed in the contracts.

WATER STILL PRESENT

The report calls attention to the fact that in a service-at-cost plant, a valuation would have to be agreed upon. The difficulties of getting a figure accepted that would be fair to the public are as great as the difficulties affecting a voluntary consolidation of the existing diverse interests without excessive cost. Generally, the companies have taken on obligations which make it impossible for them voluntarily to accept a valuation that would be fair to the public, and the flexible fare or service-at-cost will necessarily be a failure unless the valuation is in fact conservative and accepted as such by the public.

Governor Miller states that already the water has been squeezed out of the traction securities, continues the report. He refers to their market value. But the incorporation of the flexible fare plan would relieve the companies of their franchise obligations and give them the right to charge at all times adequate fares to yield a full return upon the value of their property. This would in itself restore the franchise values. The franchises would no longer be liabilities, but of great value with their perpetual rights freed from contractual restrictions. It is of vast importance, therefore, that the value of the properties should be fixed under the existing franchises, before the flexible fare scheme is embodied in the law of the state.

CLUB AT ODDS WITH GOVERNOR

The most important general objection to service-at-cost arrangement, says the report, is the difficulty of preserving proper incentives to economy and efficiency in operation. The private owners supply the management, at a fixed rate of profit. If the management is good the profit is just the same as if it is bad. The various schemes so far devised for overcoming this difficulty and restoring the incentive have not worked out in practice, and this particular trouble remains the despair of the whole flexible fare program.

With respect to the transit commission, the club takes issue with the Governor on the question of home rule. The club maintains that transit is primarily a local problem and that no plan formulated by such a commission as the Governor proposes should take effect until after it has received the approval of the Board of Estimate or else of the voters of the city at a referendum election.

Jitneys Return at Davenport

Men Unemployed Again Start Cars After City Council Nullifies Previous Regulations

The jitney bus menace, serious several years ago and since then eliminated both by law and by business conditions, has returned again to trouble the Tri-City Railway and has assumed such proportions that B. J. Denman, president of that company, has threatened to run the cars into the carhouses if the authorities do not take some action to curb the competition of the jitneys.

UNEMPLOYED RUN AUTOS

It has not been any act of the traction lines which brought about the present development of the bus lines. Factory shut-downs and lack of work, coupled with the antagonism of the City Council to the utility corporation, are responsible.

Laboring men laid off who had bought autos during the recent years of prosperity got the idea of turning their machines into an earning agency. Then along came the present City Council and rescinded an ordinance passed several years ago which placed such a heavy bond on the jitneys that they were forced out of business. This ordinance had also prescribed continuous operation, following of certain definite routes, a uniform fare of 5 cents and other requirements.

The traction lines charge a cash fare of 9 cents and the jitneys charge 10 cents. No bond protects the passenger in case of accident. The jitneys time their arrival at loading points and pick up passengers waiting for street cars.

Several buses are now operating between Davenport and Rock Island in defiance of an order of the Illinois Public Utility Commission. The Tri-City Railway has placed its case in Illinois in the hands of Attorney C. J. Searle, Rock Island, and will shortly commence action for compliance with the commission's order.

RADICALS IN POWER

In Davenport action is uncertain as little relief can be expected of the present councilmen and the only manner in which a show-down can be forced is through such a threat as President Denman has made. Taxes of the Tri-City Railway of Iowa, if apportioned to the number of street cars in operation, would mean a monthly tax of $40 on each car. The jitneys are taking a large amount of business from these cars, are running over paving which the traction lines have laid, are charging a higher fare, operating only during the traffic peaks and without bonds, and are paying an annual license fee of only $10.

Separate Cars for Women Again Urged

Trolley cars for the exclusive use of women during rush hours are provided in a bill introduced by Senator George M. Reischmann and Assemblyman John O. Gempler of New York. The measure authorizes the Public Service Commission to designate a minimum number of cars for such use.

Under the public-be-pleased policy of William G. McAdoo as president of the Hudson & Manhattan Railroad separate cars for women were operated on that road for a time, but were dispensed with after the experiment had proved them impracticable. The use of such cars on the lines in New York was also urged before the Public Service Commission but that body decided against them on the basis of the testimony presented.

Higher Fare Trend Continues

Only Thirty-four Cities with 25,000 or More Population Retain Five-Cent Charge

The upward movement of rates of fare continues, as shown by statistics compiled by the information bureau of the American Electric Railway Association giving the rates in effect on Dec. 31, 1920, in the 288 cities of the United States having a population of 25,000 or more.

Since the statement showing the rates in effect on Dec. 1 nine cities have been added to the forty-eight which were then in a 10-cent base rate, making a total of fifty-seven; cities in the 9-cent group have increased from two to four; the 8-cent cities decreased from twenty-eight to twenty-three; 7-cent cities increased from eighty-four to eighty-nine; 6-cent cities increased from fifty-six to sixty-one; and the number of 5-cent cities decreased from fifty-two to thirty-four. Five 8-cent fare cities have increased their rates since December, placing them in the higher fare groups, which explains the decrease shown in 8-cent fare cities.

At the close of 1917 there were 263 cities having a 5-cent fare; in 1918, 123; in 1919, eighty-three; and at the close of 1920 only thirty-four. In 1917 there were no cities charging a 7-cent fare; in 1918 there were thirty-three; in 1919, sixty-four, and at the end of 1920, eighty-nine. During 1917 and 1918 no city in the United States was on a 10-cent base rate; in 1919 there were twenty-five, and at the close of 1920, fifty-seven.

The comparison also shows a marked decrease in the number of cities operating under zone systems during the past year.

The accompanying summary shows the rates in effect during the four years, 1917 to 1920, and the fare situation in each city during this period.

SUMMARY OF RATES OF FARE IN EFFECT AT THE CLOSE OF THE YEARS 1917, 1918, 1919 AND 1920, IN THE 288 CITIES OF THE UNITED STATES HAVING A POPULATION OF 25,000 OR MORE

Rate of Fare	1917 Number of Cities	1918 Number of Cities	1919 Number of Cities	1920 Number of Cities
10-cent cash fare	..	..	25	57
9-cent cash fare	..	..	1	4
8-cent cash fare	..	12	12	23
7-cent cash fare	..	33	64	89
6-cent cash fare	25	78	73	61
Central area zone system with outlying "copper" zones	1	13	4	2
5-cent fare with charge for transfers	1	8	4	1
Uniform rate zone system	4	6	14	11
5-cent reduced rate tickets abolished	5	27	20	18
Original 5-cent fare (no increase)	*264	123	83	34
Total	300	300	300	300

Note—The difference between the above total of 300 and the 288 cities is accounted for by the fact that in the following cities more than one company operates: New York, N. Y., eight companies; Chicago, Ill., two companies; Tacoma, Wash., two companies — total twelve companies. * Includes 4-cent fare in Cleveland.

City Restrained by Duluth Street Railway

Judge Page Morris in Federal Court at Duluth, Minn., on Feb. 1, granted the application of the Duluth Street Railway for a temporary restraining order to prevent the city of Duluth from acting on the resolution adopted an hour earlier by the City Council authorizing the City Attorney to take legal action to force better electric railway service by the railway. The restraining order is returnable on Feb. 3 at which time arguments will be presented for and against the temporary injunction. The claim of the railway is that the injunction is necessary to protect the rights of the company. On Jan. 10 the City Council adopted a resolution directing the city attorney to proceed by mandamus action in District Court.

The company, in its latest move, contends that the city is acting in violation of its franchise contracts when it attempts to regulate the operation of cars. The company, in a complaint filed in the Federal Court, also raises the question of expense, pointing out that operating expenses under the increased service would be advanced approximately $340,000 a year over what the company has been spending.

Nashville Survey Begun

Work was begun on Jan. 24 by Ross W. Harris, Madison, Wis., on a traffic survey of the city railway conditions in Nashville along lines similar to the survey which Mr. Harris made in 1920 of railway conditions in Memphis. Mr. Harris was retained for the work in Nashville by the city of Nashville and the Nashville Railway & Light Company. The survey at Nashville was ordered by the Tennessee Railroad & Public Utilities Commission. The fact that the survey would be made was referred to in the ELECTRIC RAILWAY JOURNAL of Jan. 29, page 246.

Transportation News Notes

Mayor Seeks Nickel Fare.—Mayor Benjamin Bosse of Evansville, Ind., in his annual message to the City Council, recently asked that the city be authorized to appeal to the Indiana Public Service Commission for a reduction in the fare charged on the city lines to 5 cents. The Evansville Railways, a subsidiary of the Evansville & Ohio Valley Railway, is now charging a 6-cent fare. The members of the City Council have assured Mayor Bosse that they will back up his demand to the Public Service Commission.

New Express and Freight Rates Filed.—The Puget Sound Electric Railway, Seattle, Wash., which owns and operates the Seattle-Everett interurban, recently filed with the Public Service Commission new express rates, effective on Feb. 10. W. H. Somers, traffic manager of the company states the new rates makes some reductions and some increases, but mainly establishes three basic classes. Rates in some of these classes will include points within a 10-mile radius from Seattle; a second class will include points within a 20-mile radius and the last class within a 30-mile radius. The highest increase sought is on first and second class express rates to Everett. Rates on first class commodities, now 71-cents a hundred pounds, will be raised to 80 cents. Rates on commodities carrying a second class charge will be raised from 55 to 60 cents a hundred pounds.

Fare Increase Refused.—The State Board of Public Utility Commissioners has denied the application of the New Jersey & Pennsylvania Traction Company, Trenton, N. J., for an increase of 1 cent in each of the four zones between Trenton and Princeton. The company now collects 7 cents in each zone. The commission permitted the company to put into effect a 40 per cent increase in commodity freight rates and a 20 per cent increase in package express tariffs. In refusing the fare advance the board said: "It seems the passenger rates as proposed will result in a loss of passenger traffic to such an extent as to negative the increase in revenue if the proposed rate is allowed. It is apparent that the immediate result of each of the past increases in passenger fare has been a material falling off in number of passengers carried. Such an increase in passenger rates as petitioner now desires would not in our judgment improve the present financial condition of the company and would not give the company a fair and reasonable return on the value of its property used and useful in the public interest."

Personal Mention

The "Aisne" Marks the Passing of Hog Island

Hog Island, where the American International Shipbuilding Corporation built 122 ships for Uncle Sam, was a wonderful achievement. Today it lies idle, a monument to human and national energy, its future uncertain. In a way, it seems to symbolize the waste of energy which was one of the great but necessary features of the world war.

There, along the shore of the Delaware River, stand great gaunt structures, ways for the fabrication of fifty ships at a time. A little further down the river project a dozen or so outfitting piers. Huge plants housing machinery and stores stand back ready to feed the construction. A wonderful machine, which performed its service well. Will it ever perform again? This questionnaire remains unanswered.

These remarks are inspired by a recent memorable and enjoyable visit to Hog Island. Electric railway men all know "Matt" Brush, of former Boston Elevated Railway fame, who stepped in as president of the American International at a critical period and succeeded in engineering record shipbuilding.

Mr. Brush has just turned over his responsibilities to the Shipping Board. But he had one last ship to test. The *Aisne*, United States Army Transport, the one hundred and twenty-second and last ship to be launched at Hog Island, had to have her trial run and "Matt" and his coworkers made this the occasion for a fine party. However significant this trip of the last ship may have been, the party was no funeral.

Landlubbers (railway friends of "Matt") whose principal business is piloting street cars, saw no reason to be sorrowful but found ways of making themselves happy aboard the new craft. Maybe they were fearful for the time when an unfeeling public might let their rail systems of transportation lie, unappreciative of the past service rendered and existing intrinsic value, and were taking one final opportunity for a good time and to forget troubles at home.

B. A. Enloe Is Chairman of Tennessee Commission

The State Railroad & Public Utilities Commission of Tennessee has organized for the ensuing two years by electing B. A. Enloe chairman. Julian Campbell, new Republican member from Columbia. Tenn., who had been previously sworn in to succeed George Welch, participated in the organization. Mr. Enloe is a former member of Congress. He has been editor of daily papers in both Louisville and Nashville.

Transportation Chair Filled

S. W. Dudley, Westinghouse Air Brake Engineer, Named to Strathcona Professorship at Yale University

S. W. DUDLEY

Samuel W. Dudley, well known as an authority in both steam and electric railway circles on matters pertaining to train and traction control, retired on Feb. 1 as chief engineer of the Westinghouse Air Brake Company to accept a professorship in Mechanical Engineering in the Sheffield Scientific School, Yale University. This is one of the professorships supported by a bequest of $600,000 from the late Lord Strathcona, Canadian railway pioneer, in an effort to establish at Yale a department devoted to instruction in the economic as well as the physical agencies of transportation. In taking a broad conception of this problem, Yale has decided to correlate all the different phases under one department, rather than to deal with the various aspects under separate heads.

Starting in with the Westinghouse Air Brake Company as a special apprentice, Mr. Dudley spent the summer of that year and the next in the pattern and foundry shops and the test department, later returning to school to complete a post-graduate course. He then became attached to the office of the late Walter V. Turner, then mechanical engineer of the Westinghouse Air Brake Company. Here he had his first opportunity to deal with problems of train control in a thoroughly practical manner, being assigned as a member of the party in charge of the first road test of the type "R" triple valve between Pittsburgh and Fairchance on the Pennsylvania Railroad. Later he acted as engineer's assistant during a series of important demonstrations of the "ET" equipment and the type "R" passenger triple valve on the New York Central. He was charged with the responsibility of preparing much of the data relating to these demonstrations, which resulted in the development of the high emergency retained features which were added to the type "R" triple valve to complete type "L," later adopted for the motor cars of the New York Central's electrified zones.

In 1906 Mr. Dudley was assigned to the New York office to follow the installation, operation and maintenance of the new air brake equipment that was placed in service on electric locomotives and motor cars during the inauguration of the New York Central's terminal electrification. A year later he was called back to Wilmerding to take charge of the publicity department where he remained until 1909. He was then appointed assistant mechanical engineer.

Another promotion came in 1910, when he was made assistant chief engineer. In 1914 he was advanced to the position of chief engineer. For the past fifteen years Mr. Dudley's name has been before readers of the technical press in connection with articles devoted to air brake problems of universal interest in the transportation field.

Mr. Dudley is a member of the American Society of Mechanical Engineers, American Electric Railway Association, Engineers Society of Western Pennsylvania, the New York Railroad Club, and the Air Brake Association. He is a graduate of the Sheffield Scientific School, Yale, class of 1900.

Chairman of Illinois Commission Resigns

James H. Wilkerson, chairman of the Illinois Public Utility Commission, has resigned and will resume his law practice. This leaves only Commissioner Shaw and Dempcey, Commissioner Lucey having resigned to resume his law practice also and Commissioner Funk to go to Congress.

W. E. Cann, Toledo Commissioner

Wilfred E. Cann, for the past nine years assistant to the general manager of the Detroit (Mich.) United Railway, has been named Street Railway Commissioner of Toledo, Ohio. Mr. Cann was chosen for this position by the board of control, consisting of Henry C. Truesdall, W. W. Knight and D. H. Goodwillie. He was selected from among forty applicants who came forward as candidates for the position. His appointment took effect at midnight on Jan. 31, when the property of the Toledo Railways & Light Company was taken over by the Community Traction Company.

G. M. Cox Leaves Railway Field

George M. Cox, who resigned recently as treasurer of the Middlesex & Boston Street Railway, Newtonville, Mass., has joined the Boston Consolidated Gas Company, Boston, as assistant treasurer. Mr. Cox has been succeeded as treasurer of the Middlesex & Boston by Frank Frykstrand, formerly assistant treasurer. John A. Campbell has been promoted to assistant treasurer of the railway to succeed Mr. Frykstrand. Mr. Campbell has been in the employ of the Middlesex & Boston for the past fourteen years, having charge of the payroll department. Mr. Cox was born in Waltham, Mass., in 1866. He was graduated from the Pierce Grammar School in West Newton, in 1880 and from the Newton High School in 1884. He entered the employ of the Boston Suburban Electric Companies in 1902 as a bookkeeper. Two years later he was made chief clerk of the company and on Nov. 23, 1905, he was elected by the board of directors as assistant treasurer of the company's subsidiaries. He was later made treasurer of the Middlesex & Boston. For a number of years he has been a prominent member of the New England Street Railway Club.

G. S. Williams, Manager

George S. Williams is now general manager of the Androscoggin Electric Company, Lewiston, Me. In the issue of Jan. 8 it was stated that O. D. Mudgett had succeeded Frederick D. Gordon as general manager of the Lewiston property. Mr. Mudgett continues as superintendent of the power and light division of the company. The list of officials of the railway as at present constituted follows: Harvey D. Eaton, president; Walter S. Wyman, treasurer; George S. Williams, general manager; O. D. Mudgett, superintendent, power and light division; P. E. Weymouth, superintendent, railway division (Portland-Lewiston interurban).

F. E. Myers, Ashland, who has been president of the Cleveland, Southwestern & Columbus Railway, Willoughby, Ohio, for many years, has resigned to give practically his entire attention to his business at Ashland, including the Ashland Pump & Hay Tool Works and the Faultless Rubber Company.

Edward A. Boyd has been appointed master mechanic of the Bamberger Electric Railroad, Salt Lake City, Utah, to succeed M. L. Allen, who has been assigned to other duties. Mr. Boyd will make his headquarters at the railway's North Salt Lake shops, where he will direct the building of a number of passenger, express and freight cars. For six years Mr. Boyd was foreman of shops for the Utah-Idaho Central Railroad in Ogden. He has had considerable experience in the maintenance of electrical equipment, having had a number of years' service with the Sacramento Northern Railroad, Chico, Cal. He also served at one time or another with the Central California Traction Company and the San Francisco-Oakland Terminal Railways.

George N. Brown, formerly electrical engineer of the New York State Railways, Syracuse-Utica Lines, has been appointed district manager of the New York office of the Pittsburgh Transformer Company. Shortly after his graduation from Cornell University in 1908 Mr. Brown started railway work as inspector of car equipment with the Utica & Mohawk Valley Railway. In November, 1910, he became connected with the Boston & Maine Railroad, and took part in the Hoosac Tunnel electrification. He later served as switchboard operator in the North Adams power plant. In May, 1912, he became assistant engineer of the three lines which now form the Syracuse-Utica Division of the New York State Railways. He was later promoted to electrical engineer. Subsequently he became district manager for the Buffalo office of the Schiefer Electric Company, Rochester, N. Y.

W. B. Donaldson, purchasing agent, Seattle Division, Puget Sound Power & Light Company, Seattle, Wash., has been elected president of the Seattle Purchasing Agents' Association. Mr. Donaldson was born in Pittsburgh, Pa., in June, 1883. Going West in 1906 he entered the employ of the Seattle-Tacoma Power Company as a clerk. He was later transferred to the purchasing department, and in May, 1909, was appointed purchasing agent. This position he held until the consolidation of the Seattle-Tacoma Power Company and the Seattle Electric Company in April, 1912. He occupied the position of chief clerk in the purchasing department of the Puget Sound Traction, Light & Power Company until April, 1914, when he was advanced to assistant purchasing agent. The following year he was promoted to purchasing agent.

Frantz Herwig, director of the newly established Wisconsin Public Utilities Bureau, is by profession a newspaper man. Mr. Herwig attended the University of Michigan, but left college to enter the advertising department of the old Milwaukee *Daily News*. He was subsequently connected in various reportorial and editorial capacities with almost every newspaper in Milwaukee. His last newspaper work was on the Milwaukee *Sentinel* as director of the promotion department. He left the *Sentinel* to become executive secretary of the Milwaukee Pension Laws Commission and served in that capacity until called to his present post. Mr. Herwig's knowledge of the newspaper man's point of view and his acquaintance with the needs of the papers throughout Wisconsin will be a great asset to the holder of the position that he has just been called upon to fill. The bulletins so far issued by the Wisconsin Bureau have been well received by the press of the State. In some cases the matter used has been given front page display.

Obituary

John I. Stack, president of the Escanaba (Mich.) Traction Company, is dead.

Frederick H. Dunkak, a roadmaster of the Brooklyn (N. Y.) Rapid Transit Company, died suddenly from an attack of heart disease on Jan. 1. Mr. Dunkak was born in New York City. He had been in the employ of the B. R. T. for nearly twenty-five years. For twelve years he served as an assistant roadmaster. Four years ago he was promoted to roadmaster on the surface lines.

William M. Coleman, vice-president, secretary and general counsel of the Republic Railway & Light Company and secretary and general counsel of the Pennsylvania-Ohio Electric Company, Youngstown, Ohio, died suddenly on Jan. 21 in a hotel in Washington, D. C. Mr. Coleman was vice-president of the Central States Electric Corporation, New York City, and a director of the Peerless Motorcar Company.

Elmo Snider, foreman of air brake inspectors of the Brooklyn Rapid Transit Railroad, was one of the victims of a recent hotel fire in Hoboken where twelve people lost their lives. Mr. Snider had been in the employ of the Brooklyn Rapid Transit since October, 1903, when he entered the services of the company as air brake man at the 39th Street shop. During the next nine years he performed the duties of assistant foreman and foreman of air brakes at the Fresh Pond shops and at 36th Street shop. Prior to entering the employ of the Brooklyn Rapid Transit Mr. Snider spent several years with the New York Aid Brake Company overhauling and manufacturing air brake appliances in the company's factory.

William B. Strang, president of the Missouri & Kansas Interurban Railway, Kansas City, Kans., died at Excelsior Springs, Kan., on Jan. 13. Mr. Strang began his career as a railroad builder when he was fifteen years old. With his father he built sections of the Chicago, Burlington & Quincy, Baltimore & Ohio, Missouri Pacific and the Santa Fe Railroads from Santa Fe, N. M., to the Kansas line. In the construction of the Santa Fe line he superintended the building of the roadbed through the mountains, a hazardous task. He also built part of the Kansas City Southern and the Kansas City, Fort Scott & Memphis systems. In 1900 Mr. Strang began the construction of the Detroit, Toledo & Shore Line Railroad between Toledo and Detroit. In 1905 work was begun on the Missouri & Kansas Interurban Railway from Kansas City to Olathe. One of the first self-propelled cars in the world was perfected by Mr. Strang and operated on the Missouri & Kansas line.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER,
SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Crossarm Prices Lower

Buying Uneven in Several Sections of Country, but Stocks in Jobbers' Yards Satisfactory

Conditions in cross-arm buying seem to be rather uneven. Price reductions of about 15 per cent, effective Feb. 1, are reported from the East and Middle West, but no reduction from the South to date. Buying in the New York district is on a pretty fair basis, several satisfactory orders recently having been placed. Mid-West demand is only fair, while from the Atlanta territory the movement is quite slow. Stocks in jobbers' yards are reported good in all sections.

New prices for fir arms, two-pin, 3¼ in. x 4¼ in. x 3 ft., are quoted in New York at $61.13 per 100 in less than 1,000-lineal-ft. lots, and $54.34 in 1,000-ft. to 3,000-ft. lots. These in Chicago are $56.70 and $50.40. The N. E. L. A. fir arm, four-pin, 3½ in. x 4½ in. x 5 ft. 7 in., is quoted in New York at $138.26 and $122.91 and in Chicago $128.25 and $114, same quantities. The four-pin, 3¼-in. x 4¼-in. x 5-ft. arm is $90.56 in New York and $84 in Chicago, 1,000-ft. to 3,000-ft. lots.

From Atlanta, in lots of 1,000 lineal feet and over, two-pin, 4-ft. fir arms are quoted at $62; four-pin, 5-ft. arms at $104; N. E. L. A. arms, two-pin, 3-ft., at $106, and four-pin, 5-ft., at $157.

Quiet Market for Stranded Steel Wire

Railways Not Even Buying for Necessary Repair—Hope of Lower Prices a Factor

Buying of stranded steel wire by electric railways is now and has been for the past couple of months of the very lightest character. Not even the minimum amount necessary to make current repairs to suspension wire, guy wire, etc., is being purchased, some manufacturers state, and it is certain that traction companies are making no effort to stock ahead. The quiet market for steel wire seems to be caused by a combination of circumstances, among which are a general depression of industry, money tightness and hope of possible lower prices.

Shipments of common sizes can be made by some manufacturers from stock, but one of the largest makers, at least, has no surplus stock as yet and is quoting thirty to sixty days on new orders. This rather surprising condition is caused by the large number of back orders which piled up and which even until well into the fourth quarter of 1920 were far ahead of mill capacity. As few if any new orders are coming in and as production in this instance is on a full time basis it is thought that stocks of the finished product should appear by about the first of March.

The price situation, it seems, is a bit complicated. Railways appear to expect lower prices. Some manufacturers assert this hope is not justified under present labor and material costs. Producers are just beginning to reap the benefit of lower raw material cost.

Wages, too, have been reduced in only some departments. Nevertheless, in view of the continuing trend in those directions it appears logical to believe that the ultimate price tendency is downward. In fact one of the important producers has already led the way with a slight reduction in stranded steel wire since the first of the year.

Manufacturers in this line are generally optimistic regarding the swing of business to better buying, though when the turn will come appears uncertain. Railways have not covered their needs as to steel wire for necessary repairs, let alone for extensions that may be made in the spring; stocks do not apparently exist in the hands of any consumer and consequently the potential market should undoubtedly be large.

Are Electric Railways Unfair in Awaiting Price Declines?

Equipment Manufacturers Feel that They Have a Grievance Against Traction Companies for Their Policy of Curtailing Buying to Await Lower Prices

Some of the large manufacturers of electric railway equipment feel that they have a just grievance against the traction companies in respect to the latter's curtailment of buying in the hope that lower prices of material may prevail. It is quite generally admitted that buying in this field is lighter right now than even the depression of business and tightness of money can account for. The answer is that purchasing departments are awaiting lower prices, although their equipment needs are piling up. This leads to moot questions, such as whether prices in certain lines can come down at this time, and just at what point prices are low enough to justify buying.

Manufacturers do not deny that the curtailing of buying on a declining market is sound business sense, as they themselves have followed the same policy in purchasing raw material. Their grievance is that railway purchasing departments in expecting lower prices often do not take into consideration all the factors. These on the manufacturers' side include high money rates, fixed taxes, wage contracts which often prevent lower labor costs, stocks of material bought at high prices to cover future needs, the amount of raw material reductions and the fact that less demand and lower production entail greater overhead expense.

It is a self-evident fact that the sooner prices in the electric railway field or any other line reach a rock-bottom basis, fairly arrived at under existing labor, material, transportation and other costs, the sooner a return to normal business will be reached. Equipment manufacturers in many cases have recognized this fact by passing lowered costs squarely on to the consumer. But, according to the vice-president of a large manufacturing concern supplying traction companies with a staple article, "give the purchasing agent an inch and he'll want an ell." In other words, where prices have been reduced, buyers sometimes expect a decrease that would be greater than all the previous increases while prices were rising.

It is well to remember at this time that where an article has increased in price 100 per cent, it then requires but a 50 per cent drop to reach the former price. The executive of the above-mentioned company voices this plant by a concrete example. For purposes of illustration the cost of the company's product before the war is placed at $40 and the profit received is represented by x. In 1920 the cost had mounted to $80, but the profit per unit remained at x. If the margin of profit had been increased proportionately with costs, the gain per unit should now stand at 2x. Yet electric railways, he states, complain because in view of lowered costs, the margin of profit is not now cut to less than x.

It seems that here is a basis for misunderstanding at least, if nothing else. Manufacturers and purchasing departments can profitably clear this up, on the one hand by a frank statement as to the reasons why prices may or may not come down and on the other by a willingness to meet manufacturers half way in the one matter of price reductions.

Market for Trolley Wire Remains Quiet

Firmer Tone to Copper Would Precipitate Buying of Raw and Finished Product, It Is Thought

The market for bare copper as well as composition trolley wire is comparatively quiet. Until a firm tone develops to the copper market this condition is likely to maintain. Some wire manufacturers, recognizing the unusual opportunity presented to buy copper at its present low price of 12.75 cents spot, are stocking to cover their future needs. Others report they have not the money to buy and are unable to carry the interest charges on a tied-up investment such as a large stock of copper would represent.

When the price of copper eventually starts to move upward, however, it is probable that all consumers by some means or other will attempt to cover their copper needs as far ahead as possible. This would in turn undoubtedly have a salutary effect upon buyers of trolley wire, who would naturally desire to get in on the ground floor too.

This may account for the slight improvement in buying that is noted by a couple of producers since the first of the year. By far the great majority of utilities, however, are not financially able to stock ahead on any material that they use. Hence the greater part of the present light demand is accounted for by actual repair needs.

Prices of trolley wire have followed a gradually descending curve from their peak, commensurate with the reductions that have come about in raw material, and in some cases labor costs. Price reductions have been made as recently as within the last two weeks, and quotations are very generally shaded for advantageous orders. The current bare base price averages about 15 to 16 cents per pound although several producers refuse to quote a base price under present unsettled market conditions.

Deliveries are entirely favorable, for although no stocks of the finished product are carried in this field, except by some makers of more or less special wire, mills now are able to speed up if necessary. In general, orders can be filled in two to three weeks. The outlook for good buying during the present year, despite the present slow market, is held to be favorable by manufacturers, though the present slackness, it is stated, may continue for some little time.

Carbon Brush Demand Is Mostly for Maintenance

Increasing Tendency Noted for Traction Interests to Order Brushes in Small Amounts and for Quick Delivery

While the market for carbon brushes for strictly maintenance work is holding up about on a normal plane, buying for new motors and generators has fallen off. The curtailment of production in the automobile manufacturing field has reacted on the brush producer, since a large volume of brush business is done for the automobile trade. This, of course, releases production capacity for the making of brushes for the strictly electrical market, so that shipment is short.

Motor production in itself has suffered a recession, both in fractional sizes and in integral sizes for industrial work. There have been somewhat fewer brushes needed for maintenance also of the industrial sizes because of curtailed operation in the mills of many of the larger industries of the country.

These factors help shipments, one and two weeks being the average length of time quoted for the filling of orders, while other quotations will take up to six weeks. Where it is necessary to fill a rush order, a small quantity of brushes can be put out in two days. Brushes for safety cars can be gotten out in up to three weeks' time while for the larger types of cars from four to six weeks is quoted. It is of interest to note the large number of orders manufacturers are getting for single sets of brushes for one car motor and compare this method of buying to that normally in vogue.

And this comes right down to what seems to be more and more of a tendency today. Too many of these rush orders for overnight shipment are coming in to the manufacturers. The practice seems to be developing into one of waiting until the last minute and then ordering only a minimum number of pieces. Traction companies are particularly in the limelight in this connection, and they are the consumers which heretofore have been noted for keeping good stocks of brushes—at least to cover all emergencies. Of course, the financial condition of most roads is such as to require the limiting of future buying, but it would seem that purchases could be kept out of the rush class for this type of maintenance material, which is bound to wear out. The reaction comes, of course, on the producing abilities of the manufacturer.

Although stocks of foreign brushes are kept in this country, there is little stocking done by domestic manufacturers because of the great number of sizes, qualities and duties required by motor and generator manufacturers.

NEW YORK METAL MARKET PRICES

	Jan. 5, 1921	Feb. 3, 1921
Copper ingots, cents per lb	12.75 to 13.00	12.75
Copper wire base, cents per lb	16.25	15.75
Lead, cents per lb	4.75	4.75
Nickel, cents per lb	43.00	43.00
Zinc, cents per lb	6.00	5.50
Tin, cents per lb	36.75	32.25
Aluminum, 98 to 99 per cent, cents per lb	28.30	28.00

OLD METAL PRICES—NEW YORK

	Jan. 5, 1921	Feb 3, 1921
Heavy copper, cents per lb	10.00 to 10.50	11.00 to 11.25
Light copper, cents per lb	8.00 to 8.25	8.50 to 8.75
Heavy brass, cents per lb	6 00 to 6 50	6.00 to 6.50
Zinc, old scrap, cents per lb	3.00 to 3.25	3.00 to 3.25
Yellow brass, cents per lb	4.00 to 4.50	4.00 to 4.50
Lead, heavy, cents per lb	3.50 to 3.75	4.00 to 4.25
Steel car axles, Chicago, per net ton	17.00 to 18.00	16.50 to 17.00
Old car wheels, Chicago, per gross ton	21.00 to 22.00	21.00 to 22.00
Steel rails (short) Chicago, per gross ton	16.50 to 17.00	16.00 to 17.00
Steel rails (rerolling), Chicago, gross ton	17.00 to 18.00	16.00 to 17.00
Machine shop turnings, Chicago, net ton	6.00 to 6.50	7.00 to 7.50

ELECTRIC RAILWAY MATERIAL PRICES

	Jan. 5, 1921	Feb. 3, 1921
Rubber-covered wire base, New York, cents per lb	18.00	18.00
Weatherproof wire base, New York, cents per lb	19.00 to 20.00	18.00
Standard Bessemer Steel Rails, per gross ton	45.00 to 51.00	45.00
Standard open hearth rails, per gross ton	47.00 to 53.00	47.00
T-rail, high (Shanghai), per gross ton, f.o.b. mill	73.00	.....
Rails, girder (grooved), per gross ton, f.o.b. mill	88.00	.....
Wire nails, Pittsburgh, cents per lb	3.25	3.25
Railroad spikes, drive, Pittsburgh base, cents per lb	3.65 to 4.00	3.65 to 4.00
Tie plates (flat type), cents per lb	2.75	2.75
Tie plates (brace type), cents per lb	2.75	2.75
Tie rods, Pittsburgh base, cents per lb	6.00	6.00
Fish plates, cents per lb	2.75	2.75
Angle bars, cents per lb	2.75	2.75
Rail bolts and nuts, Pittsburgh base, cents per lb	5.50	5.50
Steel bars, Pittsburgh, cents per lb	2.35	2.35
Sheet iron, black (24 gage), Pittsburgh, cents per lb	4.20	4.20
Sheet iron, galvanized (24 gage), Pittsburgh, cents per lb	5.25	5.25
Galvanized barbed wire, Pittsburgh, cents per lb	4.10	4.10

	Jan. 5, 1921	Feb. 3, 1921
Galvanized wire, ordinary, Pittsburgh, cents per lb	3.95	3.95
Car window glass (single strength), first three brackets, A quality, New York, discount*	77%	77%
Car window glass (single strength), first three brackets, B quality, New York, discount	77%	77%
Car window glass (double strength, all sizes, A quality), New York, discount	79%	79%
Waste, wool white (according to grade), cents per lb	13 to 19	11 to 17
Waste cotton (100 lb. bale), cents per lb	11 to 15	11 to 13½
Asphalt, hot (150 tons minimum), per ton delivered	40.00	40.00
Asphalt, cold (150 tons minimum, pkgs. weighed in), per ton	36.00	36.00
Asphalt, filler, per ton	36.00	36.00
Cement, New York, per bbl	4.50	4.10
Linseed oil (raw, 5 bbl. lots), New York, per gal	.83	.77
Linseed oil (boiled, 5 bbl. lots), New York, per gal	.85	.79
White lead (100 lb. keg), New York, cents per lb	.14	.13
Turpentine (bbl. lots), New York, per gal.	.75	.70

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* These prices are f.o.b. works, with boxing charges extra.

Rolling Stock

The Chicago Surface Lines, after receiving bids on fifty new motor cars of the specifications published in ELECTRIC RAILWAY JOURNAL for Dec. 18, on page 1271, has decided not to purchase them. Instead, bids have been asked on fifty trailers in addition to the fifty now being built in the company's West Side shop. The specifications for these new cars were incorporated into a sample car which was fully described on page 110 of the July 17, 1920, issue. The fifty motor cars were intended for hauling the trailers now being built in all-day train service. It is planned to use the present Pullman-type motor cars for hauling trailers in rush hour service only. Bids on the fifty trailers will be opened Feb. 8, a very short time having been allowed for considering the specifications.

The Los Angeles (Cal.) Railway, in its program for this year has included the lengthening of eighty-nine cars, giving larger loading platforms. Their length will be increased from 34 ft. 1½ in. to 44 ft. 7 in. This alteration will allow for one extra "walk-over" seat at each end of the car. Another thirty-four cars of the interurban type are to be equipped with folding doors on the ends in place of the drop bars and curtains that have been in use. Work on the 123 cars will be distributed through the greater part of 1921 as only a few of the cars can be placed in the shops at a time, owing to the heavy demands of travel.

The London & Port Stanley Railway, a municipally owned line running from London, Ontario, Canada, to Lake Erie, will add an 80-ton electric locomotive and several passenger cars to its equipment this year.

Track and Roadway

Frontier Electric Railway, Buffalo, New York.—The Aldermen of North Tonawanda, N. Y., have approved the application of the Frontier Electric Railway for an extension of time for beginning and completing its proposed freight line between Buffalo and Niagara Falls. Under the new requirements the line must be started on or before Dec. 31, 1923, and finished by Aug. 1, 1927. Inability to finance the line at this time is the reason given by officials for not undertaking the work just now. The Pennsylvania and Lackawanna Railroads are interested in the project as they will use the line for the transportation of freight between Buffalo and Niagara Falls.

El Paso (Tex.) Electric Railway.—The El Paso Electric Railway has many improvements under consideration for 1921. The plan will cover the installation of a new turbine in the power station, the purchase of additional safety cars, additional double track and turn-outs on the street railway system, additional equipment in both power station and carhouse; also additional transformers, meters and customers' services.

Houston (Tex.) Electric Company.—The Houston Electric Company is planning the following construction program for 1921: Rebuilding eight pit tracks and three repair tracks at Milby Street carhouse, rebuilding two additional storage tracks each 400 ft. long at the Milby Street carhouse, double tracking Harrisburg Road and Lorraine Street, a distance of approximately 3,400 ft. in paved construction, using 103-lb. rail, thermit joints, cypress ties, concrete foundation and brick pavement; rebuilding ballasted track on Palmer and Engelke Streets, approximately 3,000 ft., using 70-lb. A.S.C.E. rail; double tracking Fairview Avenue and Taft Avenue approximately 1,200 ft. ballasted construction, using 70-lb. A.S.C.E. rail; installing 300 ft. siding on Lorraine Street in paved construction; extending siding No. 3 on Clark Street 800 ft. long, ballasted construction, using 70-lb. rail; extending No. 2 siding on Fairview Avenue 400 ft. long, ballasted construction, using 70-lb. A.S.C.E. rail; lowering track on Washington Avenue to new city grade approximately 3,000 ft. and installing Nos. 1 and 2 sidings in paved construction, using 103-lb. rail, brick pavement and concrete substructure; double tracking Fannin Street from Franklin to Texas in paved construction with necessary special work, using 122-lb. rail, thermit joints, brick pavement and concrete substructure.

Power Houses, Shops and Buildings

Jamestown (N. Y.) Street Railway.—The Jamestown Street Railway has filed plans for the immediate construction of a modern two-story office building on the site of the building recently destroyed by fire in West Third Street.

Texas Electric Railway, Dallas, Tex.—The passenger station of the Texas Electric Railway at Sherman, Tex., was damaged recently by fire to the extent of about $1,500. The fire started in a storage room from cause undetermined. The loss was covered by insurance.

Trade Notes

The Inland Wire & Cable Company, Cleveland, is planning to erect a new plant, 100 ft. x 350 ft., one-story, at Hammond, Ind., to cost about $100,000.

The Arthur Power-saving Recorder Company, New Haven, Conn., has received an order for 700 recorders from the Rhode Island Company, Providence, R. I.

Leon Chapuis, 36 Boulevard de Magenta, Paris, France, distributor of traction material, advises the receipt of a large order for electric railway supplies for use in the devastated regions of France.

The Edward Valve & Manufacturing Company, 72 West Adams Street, Chicago, is planning to rebuild its plant at East Chicago, Ind., recently destroyed by fire. The loss is estimated at about $350,000.

C. H. Wheeler Manufacturing Company, Philadelphia, Pa., maker of condensers, pumps, feed water heaters, etc., announces the opening of a branch sales office in the Leader-News Building, Cleveland, Ohio. W. K. Eicher is in charge.

E. D. Kellogg has been appointed New Jersey representative for the Conveyors Corporation of America, manufacturer of machinery for handling coal, sand, gravel, ashes, etc. He will make his headquarters at the company's Eastern office, 110 West Tenth Street, N. Y.

The Maring Wire Company, Muskegon, Mich., manufacturer of enameled and cotton-covered magnet wire, announces the appointment of the R. W. Lillie Corporation, 30 Church Street, New York City as its Eastern representative. The Boston office at 176 Federal Street is in charge of H. D. Steele.

The Champion Engineering Company, Kenton, Ohio, manufacturer of electric traveling cranes, has appointed A. E. Hogrebe, mechanical and electrical engineer, sales engineer for the Baltimore territory. Mr. Hogerbe has been identified with the electric traveling crane business since 1891, having been connected with the Yale & Towne Manufacturing Company, Brown Hoisting Machinery Company, Niles-Bement-Pond Company and Pawling & Harnischfeger.

The MacGillis & Gibbs Company, Milwaukee, manufacturer of cedar posts, poles and railway cross-ties, which has completed its twenty-second year in business, is distributing a booklet entitled "Poles of Cedar," in which it gives an outline of its activities and short sketch of its officers. J. E. Gerich, president and general manager, was one of the incorporators of the company and was made president and general manager in 1905.

The Roller-Smith Company, 223 Broadway, New York City, announces the appointment of the J. E. Dilworth Company, 493 South Main Street, Memphis, Tenn., as its representative in the western half of Tennessee, the eastern half of Arkansas and the northern half of Mississippi. The electrical department of the Dilworth company is in charge of E. M. Greeson, who was formerly associated with Fairbanks, Morse & Company and the Sanborn Electric Company, both of Indianapolis.

New Advertising Literature

Insulating Material.—Mica Insulator Company, 68 Church St., New York City, has just issued a new catalog, No. 85, covering the company's line of electrical insulating materials.

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If your hand brakes are "sick" or if there is anything whatever the matter with them, come to us. We are the Hand Brake Doctors.

There may be nothing really serious the trouble.

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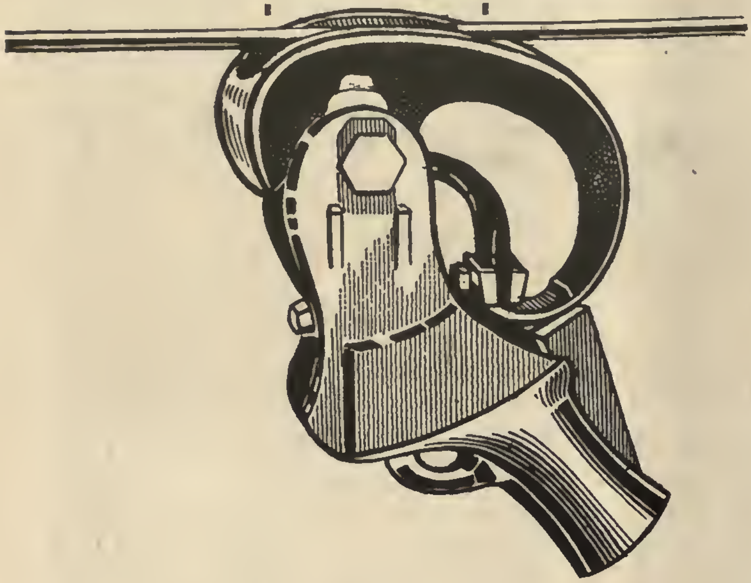

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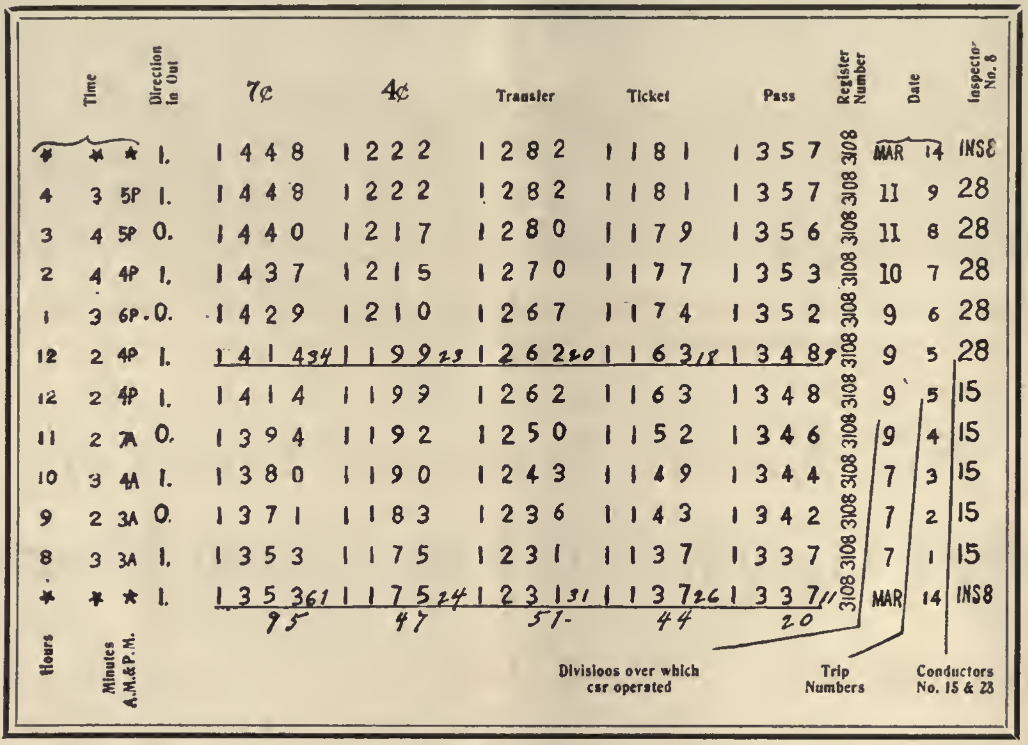

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*	*	*	I.	1448	1222	1282	1181	1357	3108	MAR	14	INS8
4	3	5P	I.	1448	1222	1282	1181	1357	3108	11	9	28
3	4	5P	O.	1440	1217	1280	1179	1356	3108	11	8	28
2	4	4P	I.	1437	1215	1270	1177	1353	3108	10	7	28
1	3	6P	O.	1429	1210	1267	1174	1352	3108	9	6	28
12	2	4P	I.	1414 34	1199 23	1262 20	1163 18	1348 9	3108	9	5	28
12	2	4P	I.	1414	1199	1262	1163	1348	3108	9	5	15
11	2	7A	O.	1394	1192	1250	1152	1346	3108	9	4	15
10	3	4A	I.	1380	1190	1243	1149	1344	3108	7	3	15
9	2	3A	O.	1371	1183	1236	1143	1342	3108	7	2	15
8	3	3A	I.	1353	1175	1231	1137	1337	3108	7	1	15
*	*	*	I.	1353 61	1175 24	1231 31	1137 26	1337 11	3108	MAR	14	INS8
				95	47	51-	44	20				
Hours	Minutes A.M.&P.M.											

Divisions over which car operated

Trip Numbers

Conductors No. 15 & 28

The principles of good business are maintained by the Ohmer System of fare protection. Each transaction is clearly indicated to the passenger and recorded in black and white at the time. The records from each Ohmer Register are compact, full of detail, easily analyzed and untamperable.

Fares are received quickly. The passenger, the conductor and the management all get a square deal.

The Ohmer System can be applied to any electric railway property without tying up any of your capital. We bear the investment burden. Our contracts are sufficiently flexible to take care of changing conditions, increased fare rates, etc., and you need never fear being caught with a lot of obsolete devices on your hands.

Ohmer Fare Register Company
Dayton, Ohio

10 AGASOTE ADVANTAGES

Advantage No. 1

Absolutely Weatherproof

The test of *weather*—snow, rain, frost, thaws, dampness and heat, the blistering sun of summer and the "stone-splitting" cold of winter—have no effect on AGASOTE CAR ROOFING. Without *any protective coating,* such as canvas, it will last as long if not *longer* than wood—in fact, will prove *cheaper* over years of service. Exposure to the elements and the passing of time itself fail to damage AGASOTE—they do not impair its hardness or toughness. Specify Ogasote for Car Roofing and Headlining and Wainscoting.

Pantasote Curtains and Upholstery Material are Standard.

The Other 9

1. Has great strength.
2. Is an absolute Non-conductor of current.
3. Is light in weight.
4. Makes a cheaper roof than wood.
5. Requires no auxiliary coating or covering such as white lead and canvas.
6. Has high insulation value against temperature.
7. Holds paint as well or better than wood or steel.
8. Saves time.
9. Saves labor.

THE PANTASOTE COMPANY

11 Broadway, N. Y. People's Gas Bldg., Chicago, Ill. 751 Monadnock Bldg., San Francisco, Calif.

AGASOTE

TRADE MARK

ROOFING

V-K V-K

NON-ARCING HARP NON-ARCING HARP

Its employment on any trolley pole will add at least 25% to the life of the wheel. An installation will verify this statement.

No current loss here

The non-arcing feature of the V-K Non-arcing Harp checks waste of current and reduces operating and maintenance costs.

Examine a V-K Harp and notice how the gripping device locks and holds the axle pin firmly in place. No chance for arcing between pin and harp and the passage of current through the wheel and bearing into the harp metal is greatly facilitated.

This firm lock also prevents wear in pin holes and always maintains a perfectly rigid bearing for the wheel. Pins and wheels may be easily changed when used in combination with V-K Oilless Trolley Wheels.

The booklet "Trolley Wheels" contains a fund of vital facts on various types of More-Jones Wheels and Harps. *Write today for a free copy.*

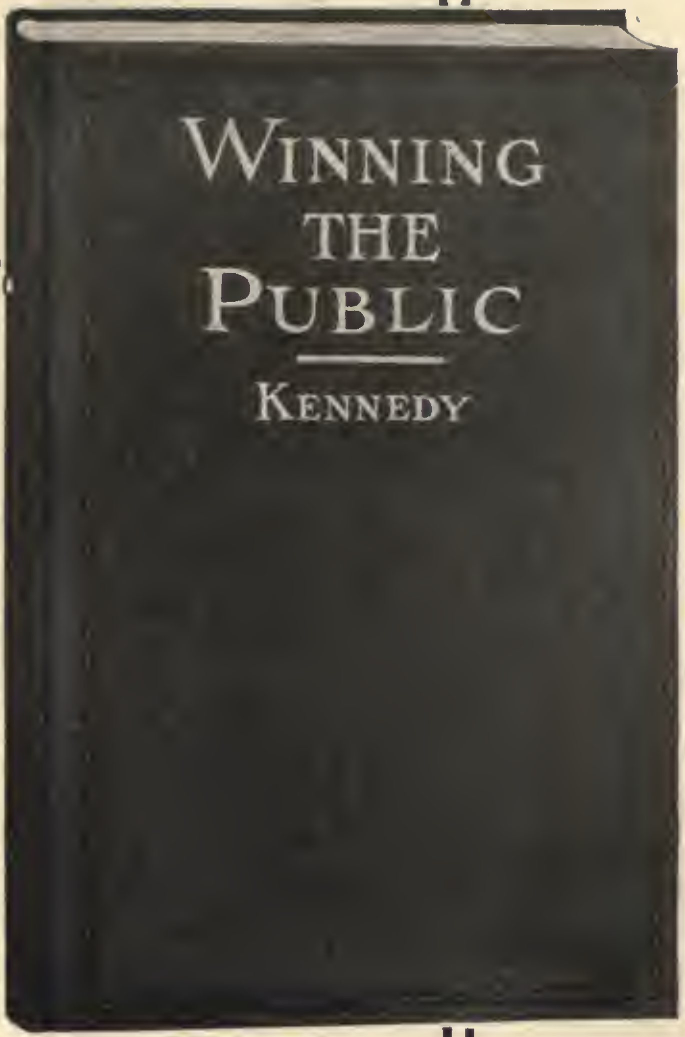
More-Jones Brass & Metal Co.
St. Louis, Missouri

TROLLEY WHEELS:
V-K Oilless, M. J. Lubricated
HARPS: V. K. *Non-Arcing*
BEARINGS: *"Tiger" Bronze*
Axle and Armature
ARMATURE BABBITT
and Similar Products

MORE-JONES

An inspirational book for the entire electrical industry—

For the central station corporation, for any public utility, for executives of such companies, for their employees, for the entire electrical industry—the key to success is *service*. Service of the right kind means expansion for the industry, bigger business for the power company, more pay and promotion for the employee of such a company. Mr. Kennedy in this new book has written the first textbook of service. He shows how to serve effectively. He proves that service brings success to the individual and to the corporation.



WINNING THE PUBLIC

By S. M. Kennedy

*Vice-President in charge of Public Relations and
Business Development,
Southern California Edison Company*

168 pages, 6x9, illustrated, $2.50 net, postpaid

Mr. Kennedy is a public service official of wide experience. He tells in his book how his own company and other successful public utility companies win the public through service. He gives central station executives useful hints on business development. He presents practical ideals for the consideration of department heads. He offers to public utility employees promotion-winning information. His book should be in the hands of every public utility official and employee, for it points the way to a broader field for the electrical industry and a greater success for all connected with the industry.

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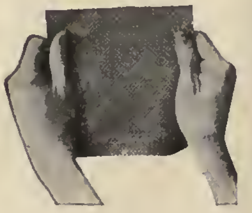
Canvas Preserver
Priming Coat for NEW Canvas

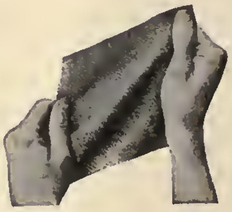
SURPACO

Canvas Roof Paint
Top Coat for OLD and NEW Roofs

This Is the Stiffest Test for Any Canvas Preserver—TRY IT!



After preparing the canvas as directed below, hold it this way when beginning the test. Note how completely the surface is protected — yet the canvas is springy and totally free from stiffness.



Watch the paint on the fibres as you bend and twist the canvas. Absolutely no cracking or peeling! When you release the canvas, see how the fibres snap back to their original position.

Take an 8-inch square of new canvas and paint it with SURPACO Canvas Preserver — give it a free, heavy coat so that every fibre will be thoroughly saturated.

After the Preserver dries, cover with two coats of SURPACO Canvas Roof Paint, allowing sufficient time for thorough drying between coats. Take particular care, though, not to apply too much paint in these second and third coats — the idea is to work the paint thoroughly into the fibre and rub it out with the brush as thin as possible over the surface. This keeps the canvas pliable and elastic.

Now for the test. When the paint has dried thoroughly, grasp the canvas firmly at the sides with both hands (see illustration above). Then STRETCH IT, TWIST IT, BEND IT, JERK IT in any way you wish. See how the fibres always spring back to their first position. Note the pliability of the entire piece of canvas, how it stands up under distortion and strain and always comes back to its original shape. Note that the paint surface is always unbroken.

⁂

After you have made this test yourself you will know why SURPACO Canvas Preserver and Roof Paint actually preserve the fibre without stiffening the canvas; why they so successfully withstand the constant twisting, heavy vibration and exposure to which every car roof is subjected.

And, you will also know why it is best always to specify SURPACO for all of your canvas roofs.

Send today for generous samples — make this rigid test — satisfy yourself — then Buy it by the Barrel.

St. Louis Surfacer & Paint Co.
Hazel and Union Aves.
St. Louis, U. S. A.
Paints for Large Corporation Users Only

Is business heartless and cruel?

Why are six $4,000 men cut off? Why not one $25,000 man instead?

IN companies all over the United States pay-rolls are being scrutinized. And time after time this happens:

A two thousand dollar man, a three thousand dollar man and a four thousand dollar man will be eliminated—a saving of $9,000. A larger saving could have been made by eliminating one $10,000 man; but the $10,000 man is kept.

Or six $4,000 men go out; but the $25,000 man remains.

WHAT is the explanation? Is business essentially cruel? Why should it visit its misfortunes on the many who are least able to bear it, instead of on the few who have prospered most?

In Board Rooms and Executive Offices the country over, salary lists are being studied and men being sifted as never before.

The answer is two-fold. The $10,000 and $25,000 men are kept, first, because it would be difficult to replace them when business picks up again.

And second, because such men understand and can perform—in a pinch—the duties of all their departmental subordinates. But the departmental man knows his own department, and is useless anywhere else.

To lift men over the dead-line

THRU the center of every pay-roll a dead-line runs. Below it are the specialized men who can do one thing and one thing only.

Above it are managers, superintendents, treasurers, vice-presidents, and presidents. They know enough about the fundamentals of sales to direct salesmen; enough about costs, accounting, factory and office management, advertising and corporation finance to be effective in *any* one of these departments.

Such men are rare; no company can afford to spare them. For with them as a nucleus it can, at any time, fill in the departmental positions in its business, and expand its activities again. Without them it is lost.

It was to train men of this character that the Alexander Hamilton Institute was formed eleven years ago, by a group of business leaders. Of the thousands of men who have enrolled for its Modern Business Course and Service, 24,054 are presidents; 5,738 vice-presidents; 4,483 treasurers; 8,932 secretaries; 19,502 managers; 4,276 sales managers. And 13,000 were technical men when they enrolled.

These men have business worries, as all men do; but the worry of losing their jobs is not one of them. In good times or bad they *must be* retained; they are the real essentials.

The joy of succeeding while you are young

IF you have studied its advertising you have been impressed with the fact that the Alexander Hamilton Institute studiously avoids exaggerated claims. It cannot double men's incomes over night nor transform failures into successes. But it *can* and *does* shorten the path to success; and affords men the joy of succeeding while they are still young.

Hundreds of its men reached positions before thirty-five, which would ordinarily have come to them only at fifty or later—men like H. F. Harris, the Industrial Engineer; Stephen B. Mambert, Financial Director of the Thomas A. Edison Industries; John G. Wood, President of the Midwest Engine Company. What the Institute has done for some men it *can* and *will* do for you.

A special appeal for technical men

ALMOST since its beginning, the Institute has been of special interest to technically trained men. Every year, about one in every ten men enrolled is a technical man. To their technical training they have added business knowledge, a combination which makes the highest type of industrial executive.

"Forging Ahead in Business"

IN a single evening in your own home you can learn the full facts about the Modern Business Course and Service. They are published in a 116-page book, "Forging Ahead in Business." It is a valuable little book that should be in the library of every forward-looking man. And to men of serious purpose it is sent without obligation; send for your copy today.

Alexander Hamilton Institute
73 Astor Place, N. Y. City

Send me "Forging Ahead in Business" which I may keep without obligation.

Name ....
Print here

Business Address ....

....

Business Position ....

Canadian Address, C. P. R. Building, Toronto; Australian Address, 8a Castlereagh Street, Sydney

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Steel Tires
Steel Tired Wheels
Solid Rolled Steel Wheels
O. H. Steel and Malleable Iron Castings
Solid Forged Geared Blanks
Steel Forgings Iron Forgings
Forged and Rolled Steel
Pipe Flanges
Ring Dies
Rings
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"The 'Standard' Brand on your material is an assurance of eventual economy."

STANDARD STEEL WORKS CO.

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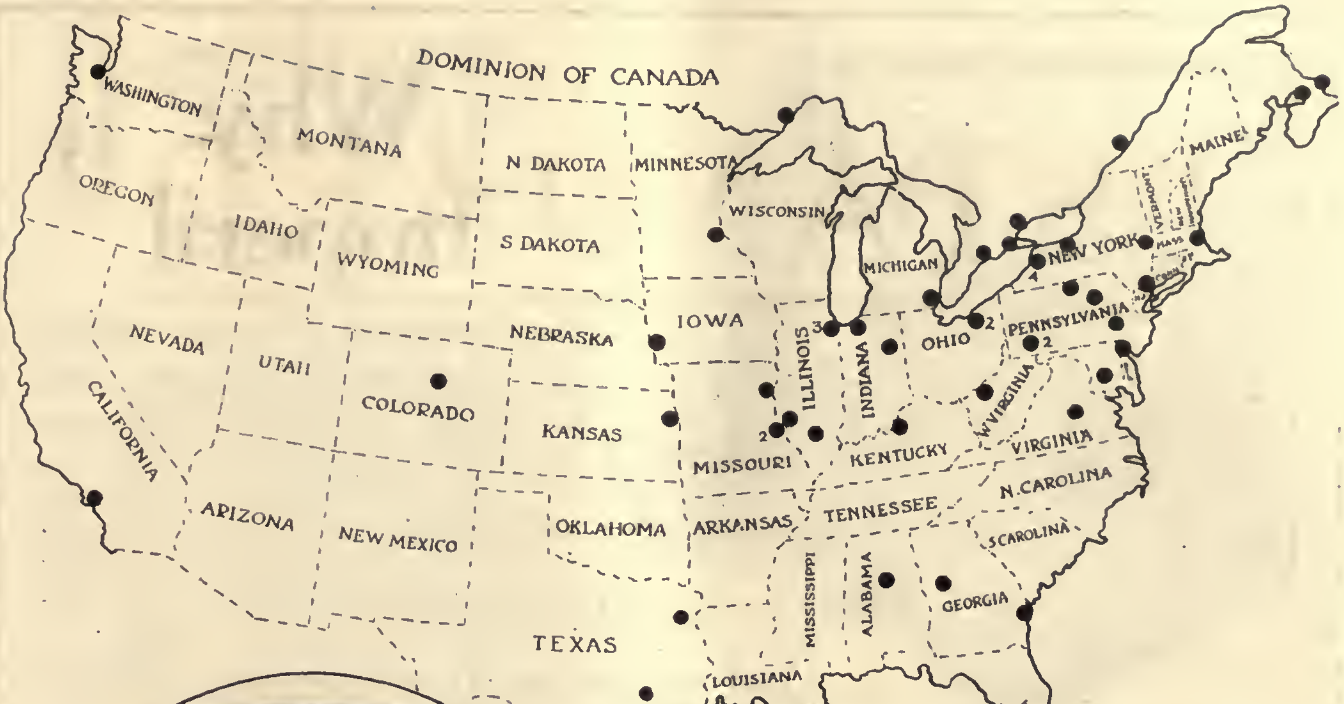
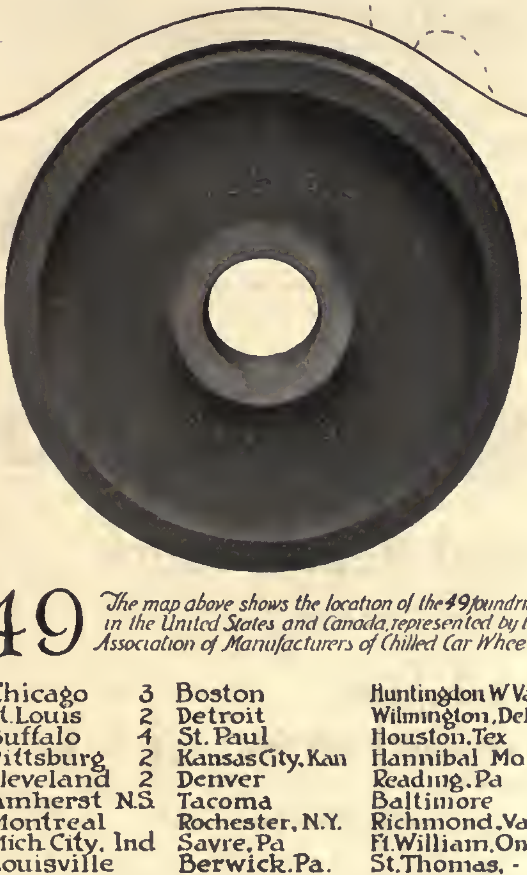




49 *The map above shows the location of the 49 foundries in the United States and Canada, represented by the Association of Manufacturers of Chilled Car Wheels*

Chicago 3
St. Louis 2
Buffalo 4
Pittsburg 2
Cleveland 2
Amherst N.S.
Montreal
Mich. City, Ind
Louisville
Mt Vernon, Ill
Ft. Wayne, Ind
Birmingham
Atlanta
Savannah
Boston
Detroit
St. Paul
Kansas City, Kan
Denver
Tacoma
Rochester, N.Y.
Sayre, Pa
Berwick, Pa.
Albany
Toronto
New Glasgow N.S
Madison, Ill.
Huntingdon W Va
Wilmington, Del
Houston, Tex
Hannibal Mo
Reading, Pa
Baltimore
Richmond, Va
Ft. William, Ont
St. Thomas, -
Hamilton,
Ramapo, N.Y
Marshall, Tex
Los Angeles
Council Bluffs

AMERICAN RAILROAD ASSOCIATION STANDARDS

650 lb. wheel for 60,000 Capacity Cars
700 lb. wheel for 80,000 Capacity Cars
750 lb. wheel for 100,000 Capacity Cars
850 lb. wheel for 140,000 Capacity Cars

The Standard Wheel for
Seventy Years

Where
CHILLED
IRON WHEELS
are made for Railway and Street Car Service

Capacity 20,000 per day
25,000,000 in Service

Association of Manufacturers
of Chilled Car Wheels

1847 Mc Cormick Bldg.
CHICAGO

Why Imperil

the success of your wiring and the safety of your road by using cheap and inferior splicing tapes?

No matter with what skill you have designed, and with what care you have selected your apparatus and wire, a bad splice will cripple your wiring system.

A splice properly made—using Okonite and Manson Tapes—will be as strong and as long lived as the insulated wire itself.

THE OKONITE COMPANY, PASSAIC, NEW JERSEY
Incorporated 1884
CENTRAL ELECTRIC CO., CHICAGO, ILL., GENERAL WESTERN AGENTS
Pettingill-Andrews Co., Boston, Mass. Novelty Electric Co., Philadelphia, Pa.
F. D. Lawrence Co., Cincinnati, O.

OKONITE
TRADE MARK.

You Can Minimize Overhead Repair Work

and successfully cut maintenance costs if you turn to

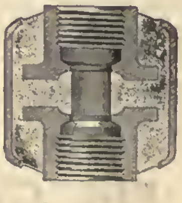
The Macallen Line

of strain insulators, hangers, splicing ears, crossings, and other overhead material.

They are "specialty" products, designed and built to make "Macallen" the standard on American railways.

It will pay you to write for information and prices.

The Macallen Insulating Joint



Adopted by principal air brake manufacturers as part of their standard equipment. Also insulates steam pipes, etc. Shell is seamless drawn steel, nipples are machined from steel rod, and insulating material is Macallen Vulcanite Compound, not affected by heat or oil—practically indestructible.

May We Send Our Catalog?

TRADE MACALLEN MARK.

The Macallen Company
Macallen and Foundry Sts., Boston

TRADE MACALLEN MARK.

THE U-RE-LITE

A modern Circuit Breaker to meet modern conditions. An I-T-E Circuit Breaker in a steel box: so much better than a fused switch that it is in a class by itself.

It opens instantly on the occurrence of a short circuit or a predetermined overload and can be as instantly reset, but it cannot be closed if the overload continues on the line.

IT DOES AWAY WITH THE CONSTANT EXPENSE AND THE DAMNABLE ANNOYANCE DUE TO THE USE OF FUSES, FOR THE CRY "FUSE BLOWN" MEANS IDLE MEN. It greatly diminishes the possibility of fire from electrical causes and affords positive protection to employees as well as to light or power circuits.

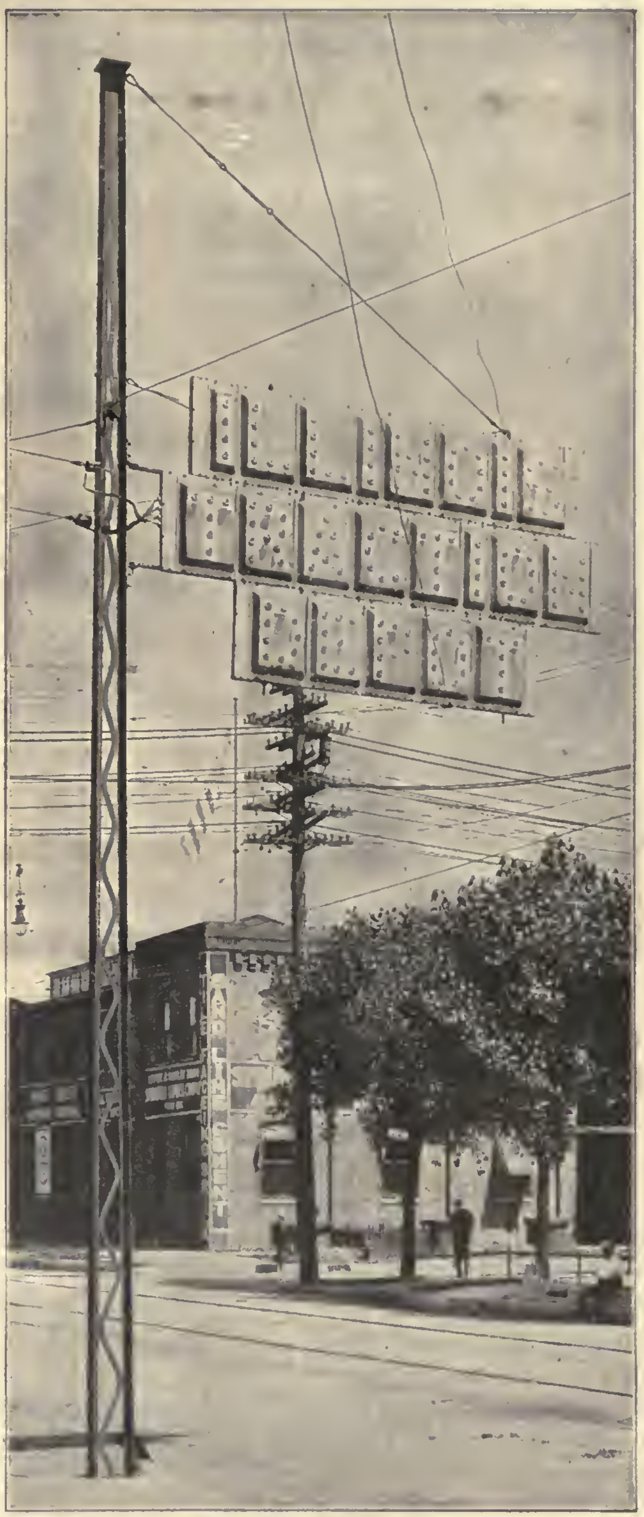
Made in capacities of 60 amperes and under for D.C. circuits of 250 volts or less and A.C. circuits of 250 volts or less, single phase.

Each pole is closed by a slight turn of the handle, which is seen projecting above and below the tripping knob, by means of which the U-RE-LITE may be opened manually.

First to the left,
Then to the right,
Turn the handle
And U-RE-LITE.

LITERATURE UPON REQUEST

The Cutter Company
PHILADELPHIA



Bates One-piece Poles Are Artistic

Perhaps Art is a secondary consideration when you plan your pole line construction, but it cannot be disregarded—especially when these poles are to be installed in exclusive residential districts or on your business blocks.

The combination of great utility and art with the lowest first cost makes the Bates Poles desirable for all types of pole line construction.

Our New 1921 TREATISE AND HANDBOOK sent upon request.

Bates Expanded Steel Truss Co.

208 South La Salle Street
CHICAGO, ILLINOIS

NACHOD

Highway Crossing Bells on the Union Traction Co. of Indiana

The motormen on the high speed interurbans of this road do not have to slow down at each crossing. The appearance of the pilot light before they reach the crossing tells them that they are secured against collision by the flashing lights and warning bell of Nachod Crossing Signals.

Why not give your motormen and passengers that feeling of security?

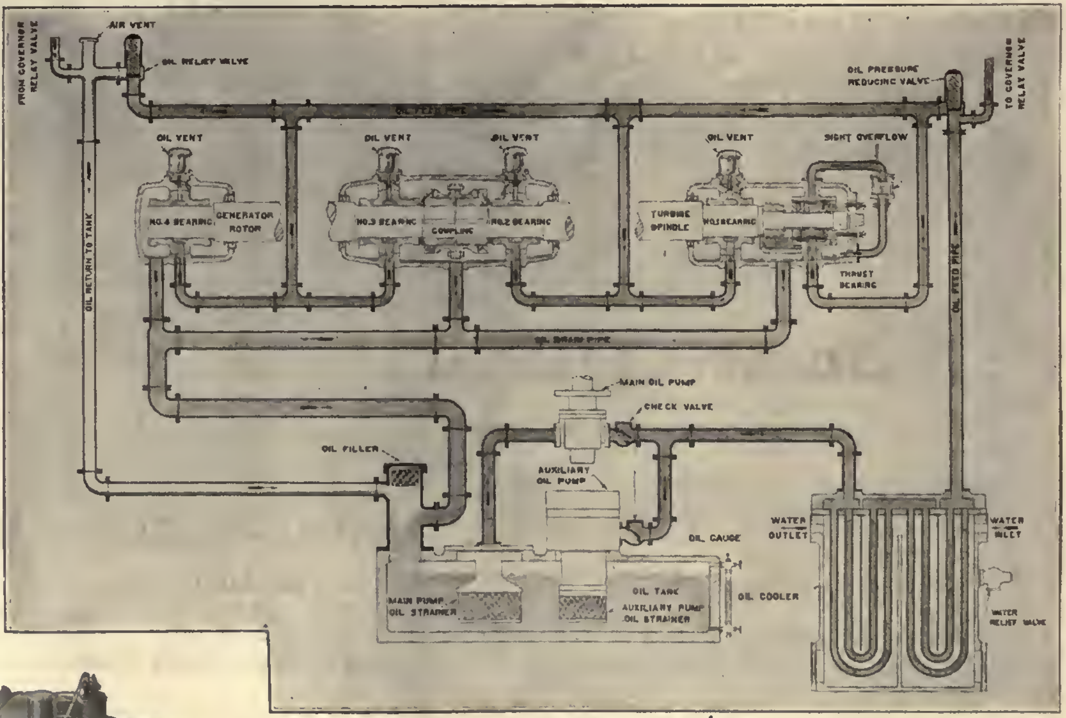
Nachod Signal Co., Inc.
Louisville, Ky.

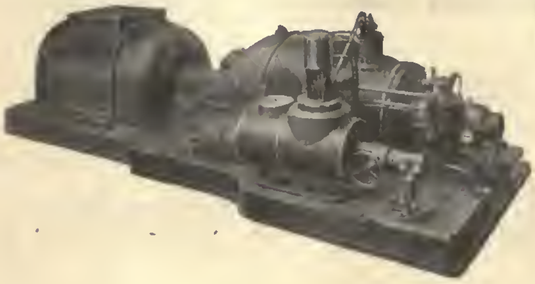
Allis-Chalmers

Steam Turbines

have complete self-contained automatic lubrication.

Diagram indicates flow of oil through the system; which has no hand operated valves and furnishes the most perfect possible protection against interrupted oil supply.





ALLIS-CHALMERS
Manufacturing Company
Milwaukee, Wis., U. S. A.
District Offices in All Leading Cities.

U. S.
Electric Signals

Used in scores of
cities to permit
safe, short headway
operation of the

SAFETY CAR

They cannot be misunderstood.

United States Electric Signal Company
West Newton, Massachusetts

Representatives:
Western: Frank F. Bodler, Monadnock Bldg., San Francisco
Foreign: Forest City Electric Service Supply Company, Salford. Eng.

If there is anything you want

that *other* readers of this paper can supply,
look for it in the

SEARCHLIGHT SECTION

—the "Opportunity" advertising of this industry

If you have anything to offer, advertise it in the "Searchlight" for quick results.

For Every Business Want—"Think Searchlight First."

Agencies Wanted
Agents Wanted
Auction Notices
Buildings For Sale
Business Opportunities
Contracts To Be Let
Educational Courses
Employment Agencies
Exchanges
For Rent Items
Industrial Sites
Machinery For Sale
Miscellaneous Wants
New Industries Wanted
Partners Wanted
Patent Attorneys
Patents For Sale
Positions Vacant
Positions Wanted
Property For Sale
Receivers' Sales
Representatives Wanted
Salesmen Wanted
Second Hand Machinery
Plants For Sale

See the Searchlight Section in this issue.

8078

This Is Liable to Happen in April

Sleet Wheel and Sleet Cutter

Before times of sleet think of

ANDERSON

The initial cost of preparedness is the only argument against it. But does that one small consideration stand in the face of the costs your system has at some time or other experienced by being unprepared?

Catalog 8 describes Anderson Sleet Foes

Albert & J. M. Anderson Mfg. Co.

Established 1877

289-293 A Street, Boston, Mass.

"—to be trusted"

FORD CHAIN HOISTS are built to be trusted. With them, men lift heavy loads, where a slip would be fatal, in the same confidence that they swing a sledge or pick up a crowbar. Because those who have used the FORD TRIBLOC know that it can be trusted to carry with safety and work with speed and sureness.

The Loop Hand Chain Guide is a feature which will commend itself to any one who has tried to work an ordinary chain hoist from the side—and found trouble.

2178-D

FORD CHAIN BLOCK CO.

2ND & DIAMOND STREETS PHILADELPHIA, PA.

OVER-SEAS REPRESENTATIVE

ALMACOA ALLIED MACHINERY COMPANY OF AMERICA ALMACOA

51 CHAMBERS ST NEW YORK, U. S. A.

PARIS BRUSSELS TURIN BARCELONA RIO DE JANEIRO

Balance

BALANCE—the most important essential in Trolley wheel and Harp construction—is a characteristic of the combination shown above.

This wheel is machined—inside and out—the 1 inch hollow Harp axle is grease packed. In short, it's a current collector that is guaranteed to stand up and give good results under the most severe strains and stresses of service.

Write to day for sample order, or, if you prefer, ask us to send you complete data.

The Advance Mfg. and Tool Co.
Cleveland, Ohio

HENSLEY

Hensley Trolley Wheel performance is guaranteed. We shall send any railway as many wheels as it desires with a positive understanding that they may be returned to us for credit even after being worn out if all we claim about the Hensley trolley wheel does not result in the test.

Hensley better-made trolley wheels of "Resisto" Bronze permit us to guarantee its performance.

Hensley Trolley & Mfg. Co.
Detroit, Mich.

You Can Bend Rails Quickly and Economically With a Watson-Stillman Hydraulic Rail Bender

Hydraulic Portable Rail Bender

The portable rail bender shown herewith is designed for use on the road. It is equipped with interchangeable formed bending blocks, and will make any bend without buckling. The hinged yoke permits the rails to be put in sidewise. It can also be used for other heavy bending.

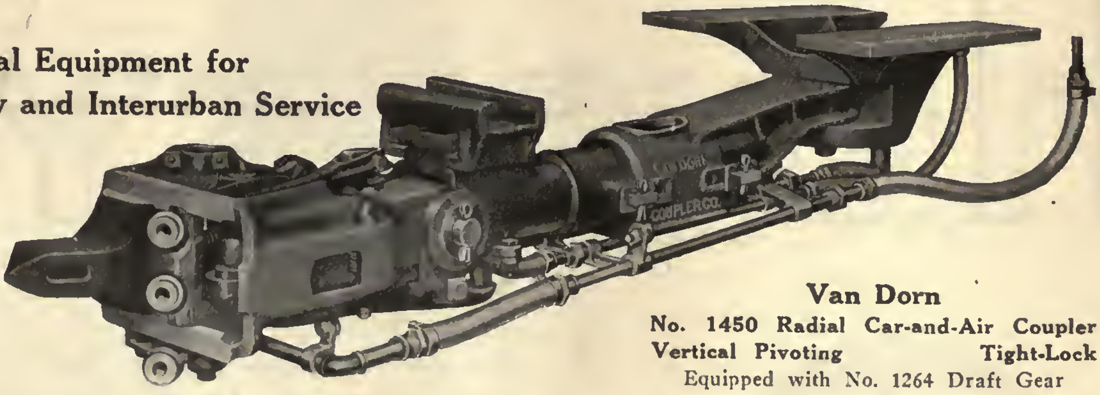
We build many other handy tools for the railway shop. Such as: Crank Pin Presses, Wheel Presses, Forcing Presses, Forging Presses, Jacks, Pit Jacks, Punches, Shears, Pumps, Accumulators, etc.

Write for Catalogs.

The Watson-Stillman Co., 46 Church St., New York
Chicago: McCormick Building Philadelphia: Widener Building

Van Dorn Car-and-Air Couplers

Ideal Equipment for City and Interurban Service



Van Dorn
No. 1450 Radial Car-and-Air Coupler
Vertical Pivoting Tight-Lock
Equipped with No. 1264 Draft Gear

The pull on the No. 1450 Coupler is taken upon four rigid surfaces and distributed through the entire body of casting. Its compensating feature against corrosion, sleet, wear, etc., insures a perfect, tight-coupling as well as proper air connections at all times.

Due to its rigid-locking principle, the wear of the VAN DORN parts is negligible and maintenance cost is reduced to the minimum. This double tight-locking device insures absolutely no movement of the Coupler heads relative to one another when in coupled position. Each coupler is locked on the opposing Coupler, independent of each other, making coupling positive and certain.

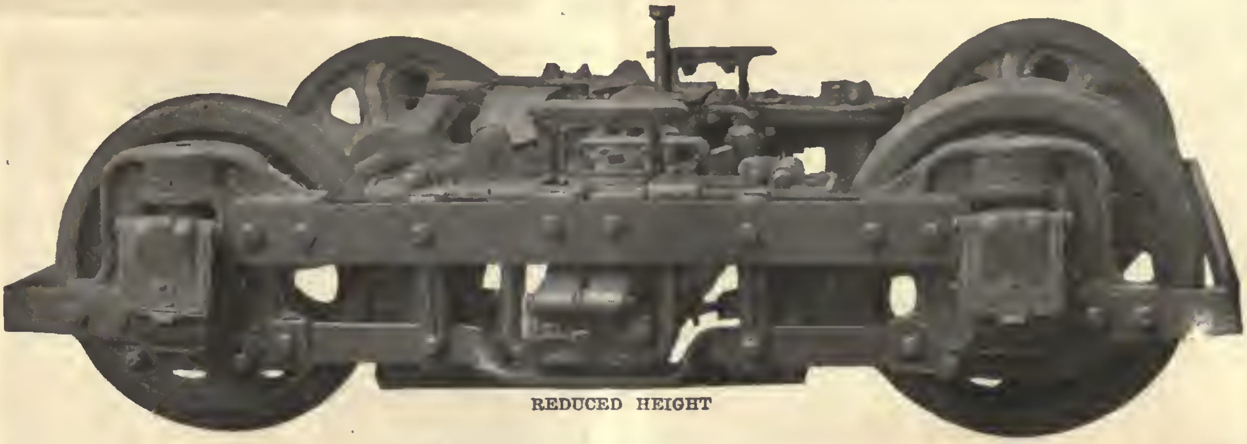
The Coupler is so designed that the VAN DORN Electric Coupler may easily be attached. The Electric Coupler cares for all circuits which ordinarily are handled through jumpers—whether they be bus-bars, multiple control, or low-voltage signal circuits.

The car, air and electrical connections are made automatically on impact of the Coupler heads, thus enabling trains to be made up instantly and without danger of accident to trainmen.

Full information gladly furnished on request. Write us today!

VAN DORN COUPLER COMPANY
2325 South Paulina Street, Chicago, Illinois

R. H.
TAYLOR REDUCED HEIGHT TRUCK



REDUCED HEIGHT

TAYLOR R. H. TRUCK

Mounted on 26-in. Wheels with Springs Over Journal Boxes.
Designed to Mount Centre and End Entrance Cars Low Down.

SWING MOTION AND FULL ELLIPTIC SPRINGS

Wheel Base 5 ft. 2 in. For Car Bodies weighing 16,000 to 22,000 lb. Motors Inside Hung.

EASY RIDING

Journals 3¾ x 7 M. C. B. Type. Height from Rail to Body Bolster, 22¾ in. Brakes Inside Hung.

TAYLOR ELECTRIC TRUCK CO., TROY, N.Y.

SPECIFICATIONS ON REQUEST

Established 1892

SEND FOR PORTFOLIO

T. S. Q.
says
"I save repair costs."

"U"

Speed and Safety

will result from the constant use of Bayonet Equipment. Renewals made instantly.

Bayonet Special Trolley Wheels

are made from the highest grade metal and are hand turned, insuring greatest accuracy and balance. Reputation was gained by competitive tests.

Bayonet Detachable Trolley Harps

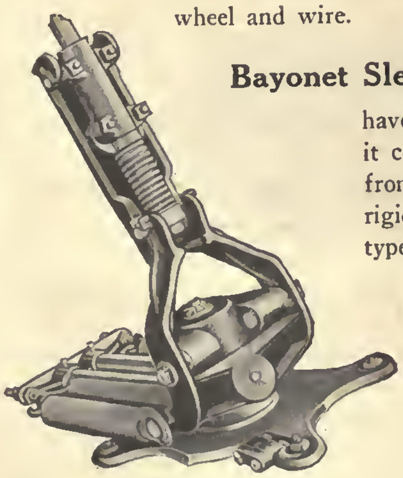
are the only trolley harps with which you can change from wheel to sleet cutter or to a new wheel in ten seconds. No tools required on top of the car. Inspections, repairs, adjustments and lubricating done at work bench later on when no schedules are being held up.

Bayonet Trolley Base with Detachable Pole Clamp

is the only trolley clamp made on which the trolley pole can be changed in 30 seconds and the wheel be in perfect alignment with the wire. No tools are required to do this job. It prevents schedules being delayed. A uniform wire pressure at all angles of the pole is obtained, thus saving on your overhead, wheel and wire.

Bayonet Sleet Cutters

have no superiors when it comes to cutting ice from the wire. Both rigid and semi-rotary types furnished.



Bayonet Trolley Harp Co.
Springfield, Ohio

Nuttall

Judge These Results

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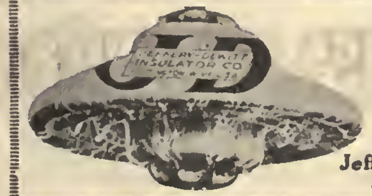

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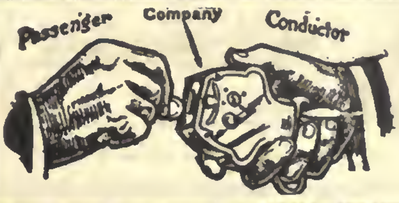

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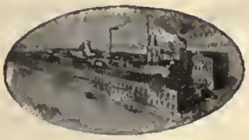

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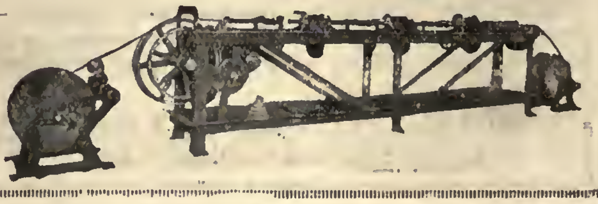

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wears longer—runs cooler—costs less

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0195

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Track Construction and Maintenance Equipment, Motors, Engines, Machine Tools, etc.

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Send for a copy of our New Big Bulletin.

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for construction and industrial work.

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we have been
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of this is the variety of this journal's Searchlight ads. Without a constant and appreciable *demand* for such machinery or services, by its readers, the market-place which these advertisements represent could not exist for any length of time.

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0200

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FOR SALE

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2—200 h.p. Harrisburg Engines, Belt Connected to Westinghouse Generators.

1—B & W Boiler, 2 Keeler Boilers, Water Heaters, Pumps, Piping, Switchboards and etc.

All in first class operating condition. Immediate delivery. Make us an offer.

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Two 300-H.P. 500 Volt MILL MOTORS

Two Westinghouse 300-h.p. 345 to 500 r.p.m., 500 volt, D.C., compound wound motors, with one spare armature, including two Cutler-Hammer, 300-h.p., 500 volt, D.C. Starters.

Condition good. Ready for inspection. Reason for selling, voltage changed. Write

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Excellent Shape—Practically New

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Costs Little
and is
Quick Acting

0231

NEW
REBUILT **ELECTRIC MOTORS** REWINDING
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New and Relaying Rail
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Searchlight Section

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1—500 kw., G.E., 3 ph., 60 cy., 4150 v., 300 r.p.m. generator dir. ctd. to 800 hp., 3 ph., 25 cy., 9000 v., 300 r.p.m. motor.

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2—100 kw., Westg., 6 pole, 600 v., gen., each dir. ctd. to 150 hp., 3 ph., 25 cy. motor. These are self contained units on cast iron sub-bases.

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2—300 kw., Westg., 3 ph., 60 cy., 370 v., A.C., 600 v., D.C., 600 r.p.m.
2—200 kw., G. E., 25 cy., 370 v., A.C., 600 v., D.C., 750 r.p.m.
1—150 kw., Westg., 2 ph., 60 cy., 270 v., A.C., 575 v., D.C., 720 r.p.m.
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6—500 kva., G. E., 13200 prim., 460 secy.
3—200 kva., Westg., 16500 v., prim., 460 secy.
3—200 kw., G. E., 6450 v., prim., 170 secy.
3—165 kva., G. E., 2300 v., prim., 430 secy.
3—150 kw., G. E., 6000 v., prim., 63 secy.
3—125 kw., Westg., 2200 v., prim., 220 secy.
2—75 kva., G. E., 13800 v., prim., 115/230 secy.
3—50 kva., G. E., 13600 v., prim., 115/230 secy.

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3—2000 kva., G. E., 66000 v., prim., 6600-13200/22000 v., Y secy.
3—2000 kva., G. E., 66000-2200/4000 Y vs.
2—1250 kva., 3 ph., G. E., 26400/13200 prim., 2400/2200 v., secy.
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3—200 kva., G. E., 2200 prim., 370 secy.
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3—100 kw., G. E., 9200 v., prim., 2300 secy.
2—100 kw., G. E., 6600/5740 prim., 2760/2400 secy.
3—100 kw., G. E., 6600 v., prim., 605/504 secy.
3—100 kva., Westg., 11000-500 volts.
3—100 kw., Westg., 440 v., prim., 220 secy.
3—75 kva., G. E., 11000/9900-6600 vs.
3—76 kva., G. E., 2200 v., prim., 370 secy.
3—75 kva., Allis-Chal., 6600 v., prim., 440 secy.
3—55 kw., G. E., 2300/2070-370/230/185 vs.
3—50 kva., Westg., 6600/6300/6000 v., prim., 440/220 secy.
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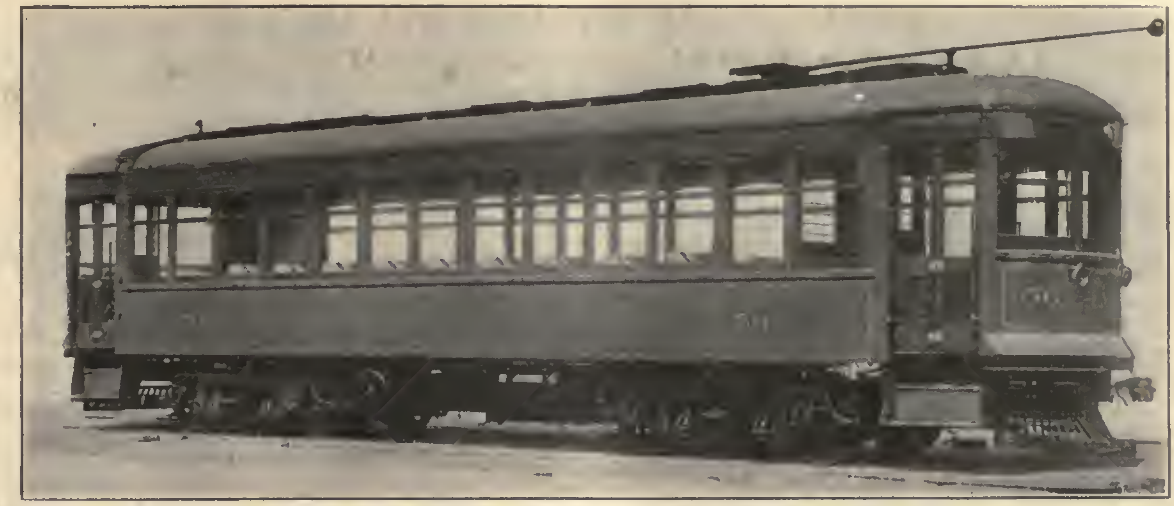

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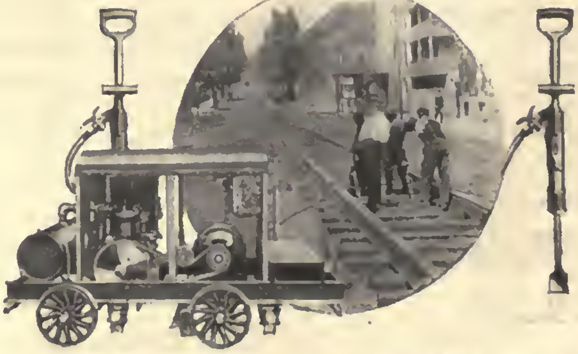

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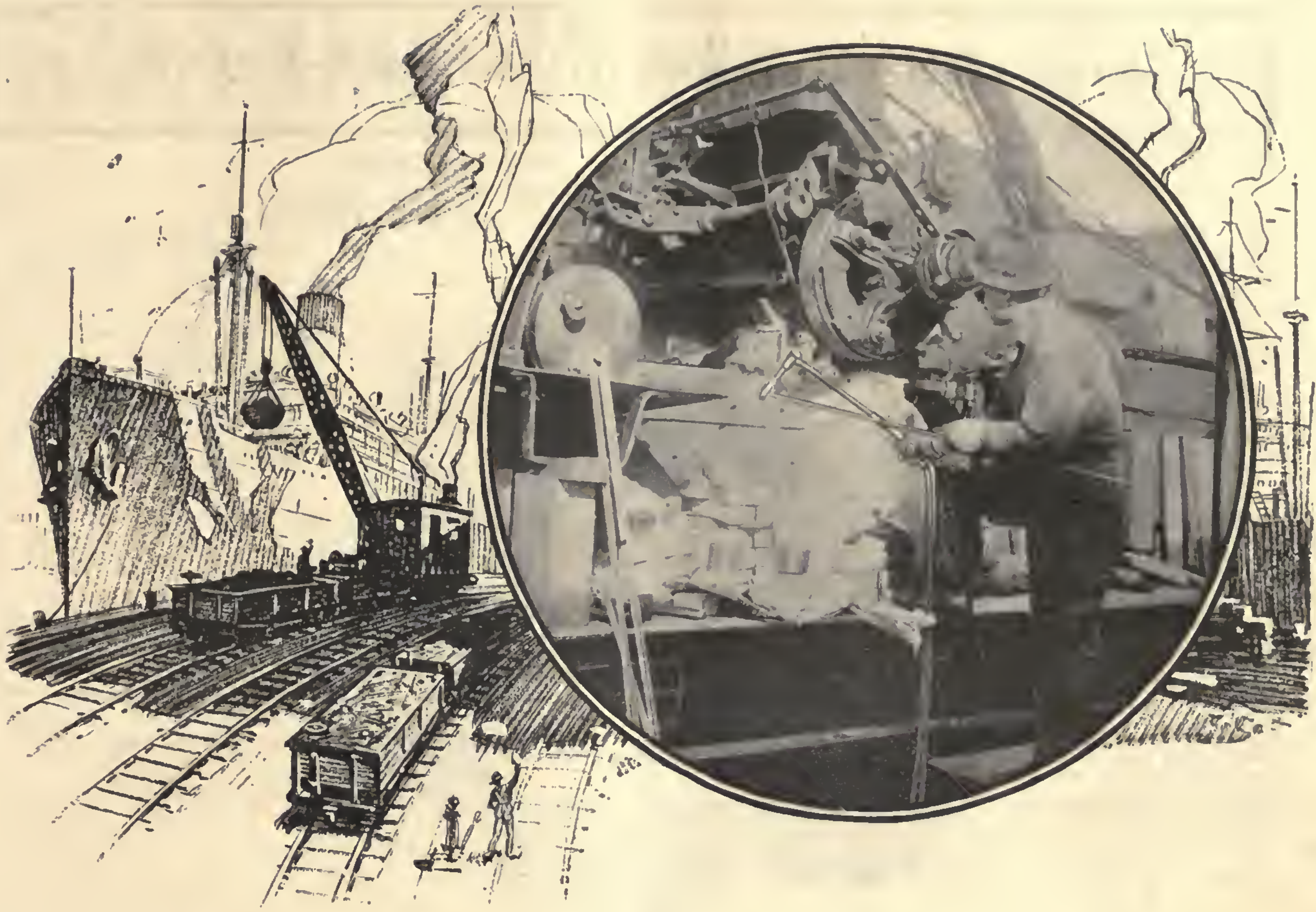

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Ernest Keller, Frank C. Hedley, Brooklyn, N. Y.
E. ALLISON THORNWELL, 1026-7 Atlanta Trust Bldg., Atlanta, Ga.

J. L. WHITTAKER, 141 Milk St., Boston, Mass.
F. F. BODLER, 903 Monadnock Bldg., San Francisco, Calif.
W. McK. WHITE, 343 South Dearborn St., Chicago, Ill.

TOOLS

- Armature and axle straighteners
- Armature shaft straighteners
- Armature buggies and stands
- Babbitting molds
- Banding and heading machines
- Car hoists
- Car replacers
- Coil taping machines for armature heads
- Coil winding machines
- Pinion pullers
- Pit jacks
- Signal or target switches
- Tension stands

CAR EQUIPMENT

- Armature and axle bearings
- Armature and field coils
- Bearings (axle and armature)
- Brush-holders and brush-holder springs
- Brake, door and other handles
- Brake forgings, rigging, etc.
- Car trimmings
- Commutators
- Controller handles
- Forgings of all kinds
- Gear cases (steel or malleable iron)
- Grid resisters
- Third-rail shoe beams and accessories
- Trolley poles (steel) and wheels

INTERURBAN CARS

Originated to satisfy a particular transportation need the Interurban Electric Railway in the United States is still an important factor in the development and expansion of cities and towns. While facing more severe competition from other forms of transportation many Interurban Electric Railways have kept the lead by giving a superior service to that furnished by their competitors.

Interurban electric cars and trucks today must be of a high standard. Nothing has a more important influence on the success of a Public Carrier than the character of its rolling stock.

A 55-ft. Interurban Car, mounted on Brill 27-MBC-2 trucks, built by the G. C. Kuhlman Car Company for the Buffalo-Niagara Falls High-Speed Line.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.
AMERICAN CAR CO. — G. C. KUHLMAN CAR CO. — WASON MANF'G CO.
ST. LOUIS MO. CLEVELAND, OHIO. SPRINGFIELD, MASS.

No matter how good the manufacturer may know his product to be — it is the user's opinion that counts

CP-25
10 Ft. Air Compressor

The Safety Car Air Compressor that has "Made Good"

More than 70 electric railway companies in such cities as Kansas City, Mo., Terre Haute, Ind., Bridgeport, Conn., Madison, Wis., and Richmond, Va., are operating safety cars equipped with General Electric CP-25 (10 cu. ft.) air compressors.

Approximately 900 CP-25's have been sold for use on safety cars, of which more than 700 are now in service, and without exception their owners are entirely satisfied with their performance.

The CP-25 weighs approximately 150 lbs. less than the next larger size compressor; it is liberally designed, both electrically and mechanically and can be relied upon to operate under the most severe service conditions with a minimum amount of attention.

General Electric Company

General Office
Schenectady, N.Y.

Sales Offices in
all large cities

25-69

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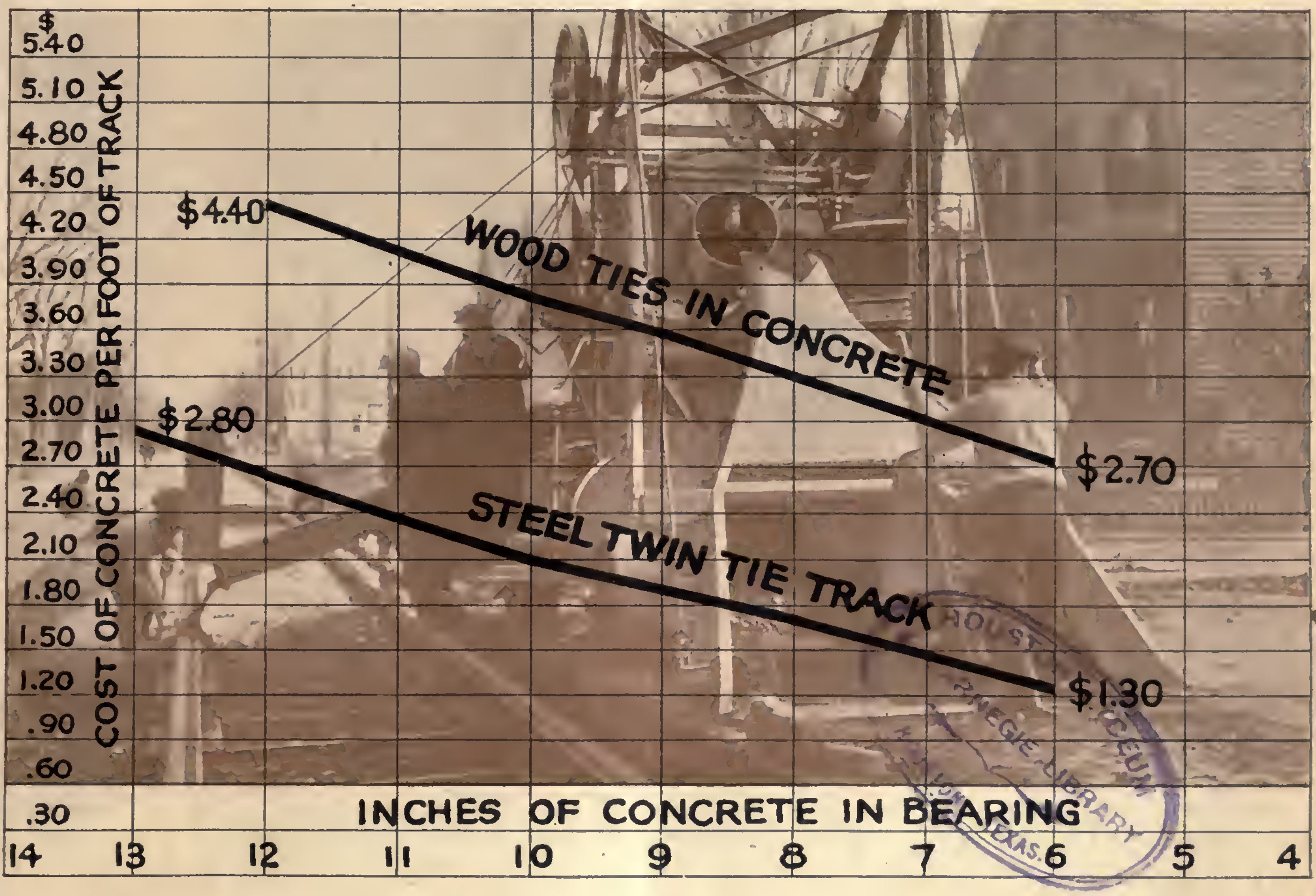
ELECTRIC RAILWAY JOURNAL



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Non-essential Concrete Costs More Than Steel Ties

IN conventional types of concrete track construction with wood ties, often *only 50 per cent* of the total cubic contents of the track foundation transmits the wheel loads from the tie to the subgrade.

The inefficient concrete between wood ties and at their ends is an economic loss when regarded as part of the track foundation.

The fundamental economy of Steel Twin Tie construction depends upon a more complete utilization of the concrete in the track foundation than is possible with wood tie designs.

The comparative initial economy of Steel Twin Tie construction depends on the type of construction with which it is compared.

In order to determine the possible saving on your property, include a comparative estimate with Steel Twin Ties on the work your track department has up for 1921.

Price on Twin Ties at your delivery point will go forward by mail or wire at your request.

THE INTERNATIONAL STEEL TIE COMPANY, Cleveland, Ohio

Multiple Unit Maximum Traction Car
in Milwaukee

The Control that is Chosen For The Most Difficult Service, And Where Nothing But The Best Is Acceptable

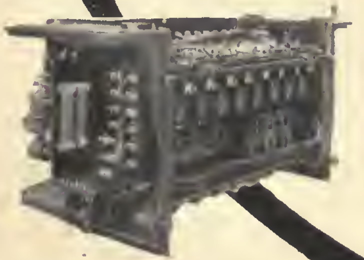
HL Switch Group
Showing Construction

That's why it is used so extensively for the subways, elevated systems in New York, Chicago, and Boston, and on a large number of the country's prominent city and interurban lines.

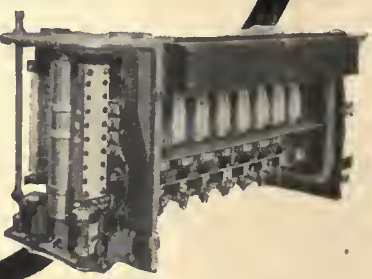
No other control suitable for either single car or train operation has merited such preference. There are eleven full years of most satisfactory performance and unparalleled accomplishment back of HL control as a testimony of its value to all who are facing the present day problems of Mass Transportation and the replacement of obsolete equipment.

The Master Controller and Control Switch in Cab. All other Circuit-Breaking Devices are beneath the floor.

Westinghouse Electric & Manufacturing Co.
East Pittsburgh, Pa.



Controller Box with Cover off
Rear Side of Switch Group.



Controller Box with Cover Off
Front Side of Switch Group

Westinghouse

Vol. 57, *No.* 7 New York, February 12, 1921 *Pages* 293-340

Electric Railway Journal

HENRY W. BLAKE and HAROLD V. BOZELL, Editors HENRY H. NORRIS, Managing-Editor

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MEMBER AMERICAN ELECTRIC RAILWAY ASSOCIATION 1921

Circulation of this issue, 6,375

Advertising Index—Alphabetical, 52; Classified, 46, 48, 50; Searchlight Section, 43-45

THE LATEST IN STREET RAILWAY TRANSPORTATION

The new Safety Cars put Fargo-Moorhead—so far as the street railway is concerned—in the class with the most progressive cities in the country.

Such cities as Brooklyn, Boston, Detroit and Newark are demanding these new Safety Cars because they are faster, safer, more comfortable and include those improvements which the people in a busy city demand.

The new cars will make much better time than the old ones, if you will let them. To get the added speed all you need do is to have the exact fare ready. That is important. It is an application of the Golden Rule—speed up the service for your fellow passengers because you expect them to help speed it up for you.

Remember—Please have the exact fare ready.

FARGO & MOORHEAD STREET RAILWAY COMPANY.
M. L. Hibbard, General Manager.

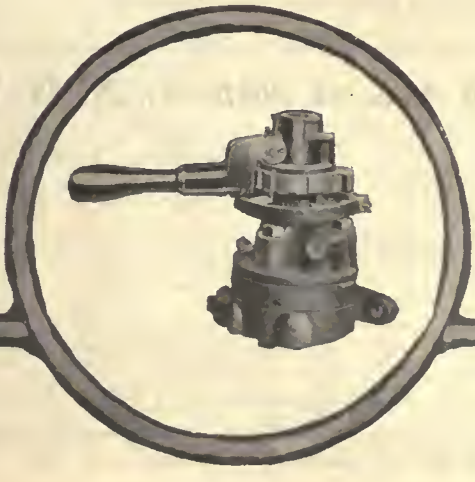
Safety Car Service Is Worth Advertising

DO you realize how gratifying it is to know that you have service good enough to advertise? Safety Car Operators do!

Here's the Fargo & Moorhead Street Railway Company telling its patrons about the 15 new safety cars with which they are to give 52 per cent more service—Not just "Service" either, but better, faster, safer service; all with the GENUINE Safety Car, of course.

It Is a Safety Car Only

when equipped with automatic, laborless apparatus, so interlocked that regardless of the illness or distraction of the operator, the power will be cut off instantaneously, the air brakes and sander apply immediately thereafter and the doors unlatch for safe and easy exit. Furthermore it is a Safety Car only when the doors must be closed and the step folded before the car can start, and when the airbrake must be applied before the doors are opened and the step lowered in bringing the car to a service stop.



Safety Car Devices Company
Boatmen's Bank Bldg., St. Louis

Chicago San Francisco New York Washington Pittsburgh

Embracing the Entire Field

BRAKES
FOR
EVERY
CLASS
OF
SERVICE

Westinghouse Traction Brakes are not limited to a single class of service. They cover the field in its entirety.

STRAIGHT Air Brake for ordinary low-speed city service.

Straight Air Brake with Emergency Feature for single motor cars, or two-car (motor and trailer) train in city and suburban service where moderate speeds prevail.

Quick Recharge, Quick Service, Graduated Release, Straight Air Feature, High Pressure in Emergency, Automatic Brake for electric trains of two to five cars for suburban and interurban high-speed service.

Quick Action, Quick Recharge, Quick Service, Graduated Release, Automatic Brake for trains of five to ten cars in high-speed electric railway service.

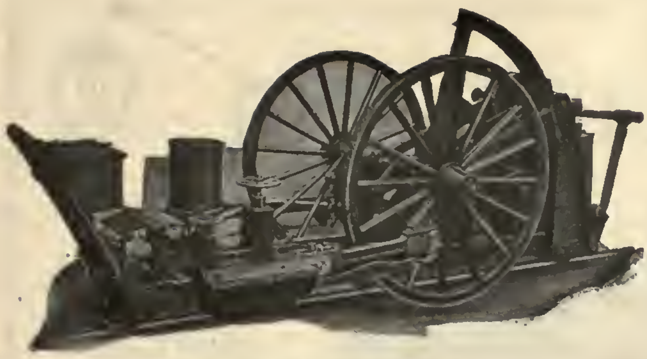
Electro-Pneumatic, Instant and Simultaneous Action, High-Pressure in Emergency, Automatic Brake for multiple-unit elevated, subway and high-speed electric surface lines; also for electrified divisions of steam railways.

Variable-Load Brake for all heavy electric railway service where uniform stopping distances are essential.

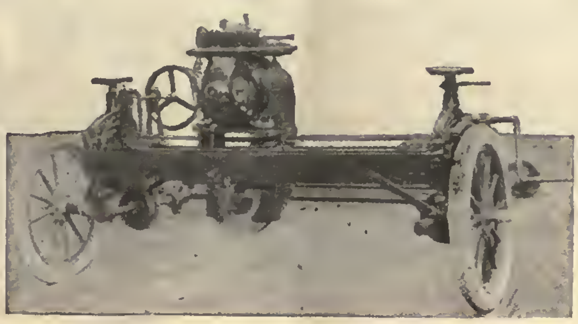
Westinghouse Traction Brake Company

General Office and Works: Wilmerding, Pa.
"Fourteen Miles East of Pittsburgh"

New York
San Francisco
Washington
Pittsburgh
Chicago
St. Louis



Reciprocating Track Grinder



Universal Rotary Track Grinder

Atlas Rail Grinder

At least TWO of these essential pieces of equipment should be owned and operated by *your* railway.

WHY?

There are many good reasons—each proven good by actual service.

Let us explain in detail

RAILWAY TRACK-WORK CO.

3132-48 East Thompson St., Philadelphia, Pa.

EXCLUSIVE AGENTS:

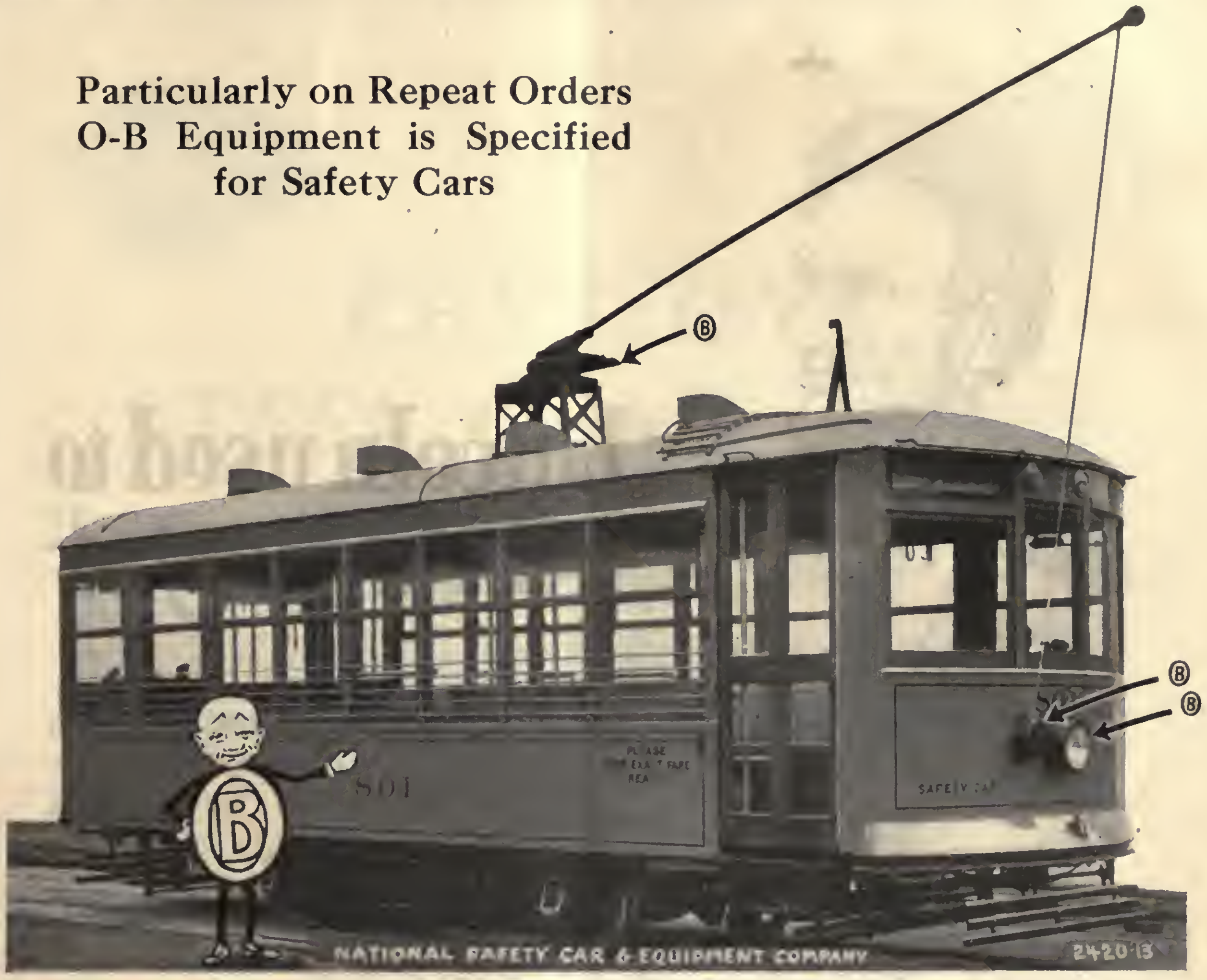
ATLAS RAILWAY SUPPLY CO.
Chicago, Ill.

ELECTRICAL ENGINEERING & MANUFACTURING CO
Pittsburgh, Pa.

CHAS. N. WOOD CO.
Boston, Mass.

HITCHCOCK, LLOYD & CO., Inc.
77A Queen Victoria St., E. C.
London, England

Particularly on Repeat Orders O-B Equipment is Specified for Safety Cars



In order to make the most of safety cars—railway men appreciated the necessity of equipping these little money makers with the best mechanical devices.

So, on many properties—particularly where the second bunch of one-man cars has arrived—you will find O-B Equipment.

O-B Bases, O-B Catchers and Crouse-Hinds Imperial Headlights are used on the car in the photograph.

The Ohio Brass Company

Mansfield, Ohio

New York Philadelphia Pittsburgh Chicago
San Francisco Los Angeles Paris, France

Manufactures: Car Equipment, Rail Bonds, Trolley Material, High Tension Porcelain Insulators, Third Rail Insulators.

Lincoln used to tell the story of

the man who refused to mend a hole in the roof of his house. When it rained he couldn't and when the sun shone he didn't need to. And he wondered why people called him a failure.

A big company we know refused to advertise when business was bad—and when business picked up said there was no need to advertise.

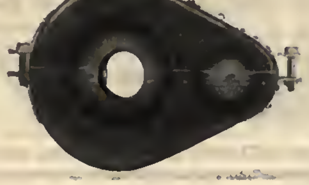
Some day that company will be wondering why they failed to keep pace with their competitors.

The point is—

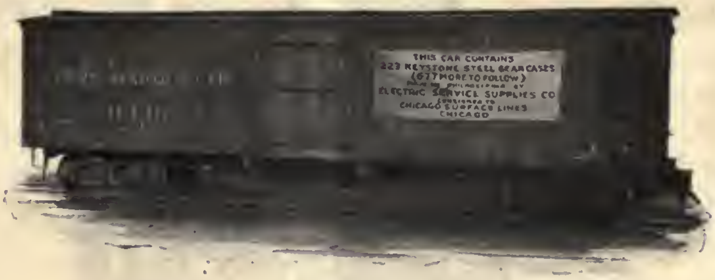
Keep Advertising in the

SEARCHLIGHT SECTION

0181



KEYSTONE STEEL GEAR CASES



The first of four carloads of Keystone Steel Gear Cases to Chicago Surface Lines

The second of four carloads of Keystone Steel Gear Cases to Chicago Surface Lines

Like many other operating companies the Chicago Surface Lines are large users of Keystone Steel Gear Cases. The fact that Keystone Cases are made of extra-quality special analysis steel and are both riveted and electrically spot-welded is a reason why you, too, should use them. Other reasons will be found in the many details of construction peculiar to Keystone Cases—all of which give them the great resistance required of them in service. Do as Chicago does—buy Keystone Gear Cases.

Write for data sheets.

ELECTRIC SERVICE SUPPLIES CO.

Manufacturer of Railway Material and Electrical Supplies

PHILADELPHIA
17th and Cambria Streets

NEW YORK
50 Church St.

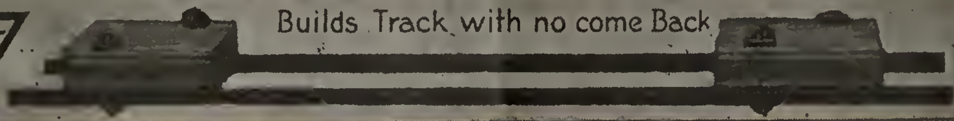
CHICAGO
Monadnock Building

Canadian Distributors: Lyman Tube & Supply Co., Ltd., Montreal, Toronto

The RESILIENT RAILWAY TIE

DMT Co

Builds Track with no come Back



Is your track investment a long time security or a short time demand note

Concrete and long life are synonymous *if* proper safeguards are placed around the concrete. Protected against a hammer blow concrete will last indefinitely; unprotected it will crumble up and pass on.

The *Resiliency* in the Dayton Tie absorbs the hammer blow and is the security for a long life to track built in concrete.

Write us for detailed information and be prepared to make your track investment a long time security.

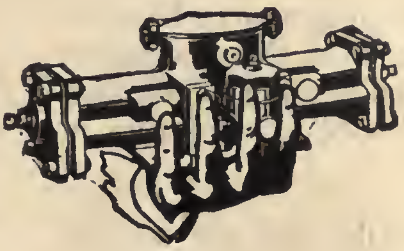
THE DAYTON MECHANICAL TIE CO., 704 COMMERCIAL BUILDING, DAYTON, OHIO

Standardize! Pneumatize!

Clang! Clang! Let's Go!!

Stamps the impatient motorman as he looks around and sees that the conductor is still a distracted car cashier.

With the traffic policeman at the crossing giving the "Go-Go," the conductor's delay may mean the loss of minutes—not just seconds.



What's the Remedy?

With National Pneumatic Door and Step Control on that car the conductor while still handling change or transfers could close the doors with a flip of his elbow or a push of his body.

And with Motorman's Signal Lights and Interlocking Safety Door Control added he wouldn't even have to reach up to a signal cord, because the closing of the doors would also signal the motorman and start the car instantaneously with a safety unapproachable by the most conscientious crew.

Just for fun, ask your platform salesmen what this combination could do for you in the maintenance of rush-hour schedules, in improving fare collection and in making the platform accident impossible.

Make your peak periods produce maximum profit and efficiency

Manufactured in Canada by
Dominion Wheel & Foundries, Ltd.
Toronto, Ont.

National Pneumatic Company, Inc.
50 Church St., New York
Edison Bldg., Chicago
Works: Rahway, N. J.

If you want proof— Ask for it.

Every week for the past several years, we've been harping on the time saving — the labor saving — the money saving characteristics of Johnson Fare Boxes.

We've told you that they speeded up schedules—brought about better service — better public relations — helped hold the honest conductor and get rid of the dishonest one — practically eliminated the free rider — insured maximum fare collection — increased gross revenue 3 to 10%.

We've told you that more than 200 progressive Electric Railways have proved all these claims to their complete satisfaction. We've given you the names of a good many of these properties and have cited specific examples of money saving.

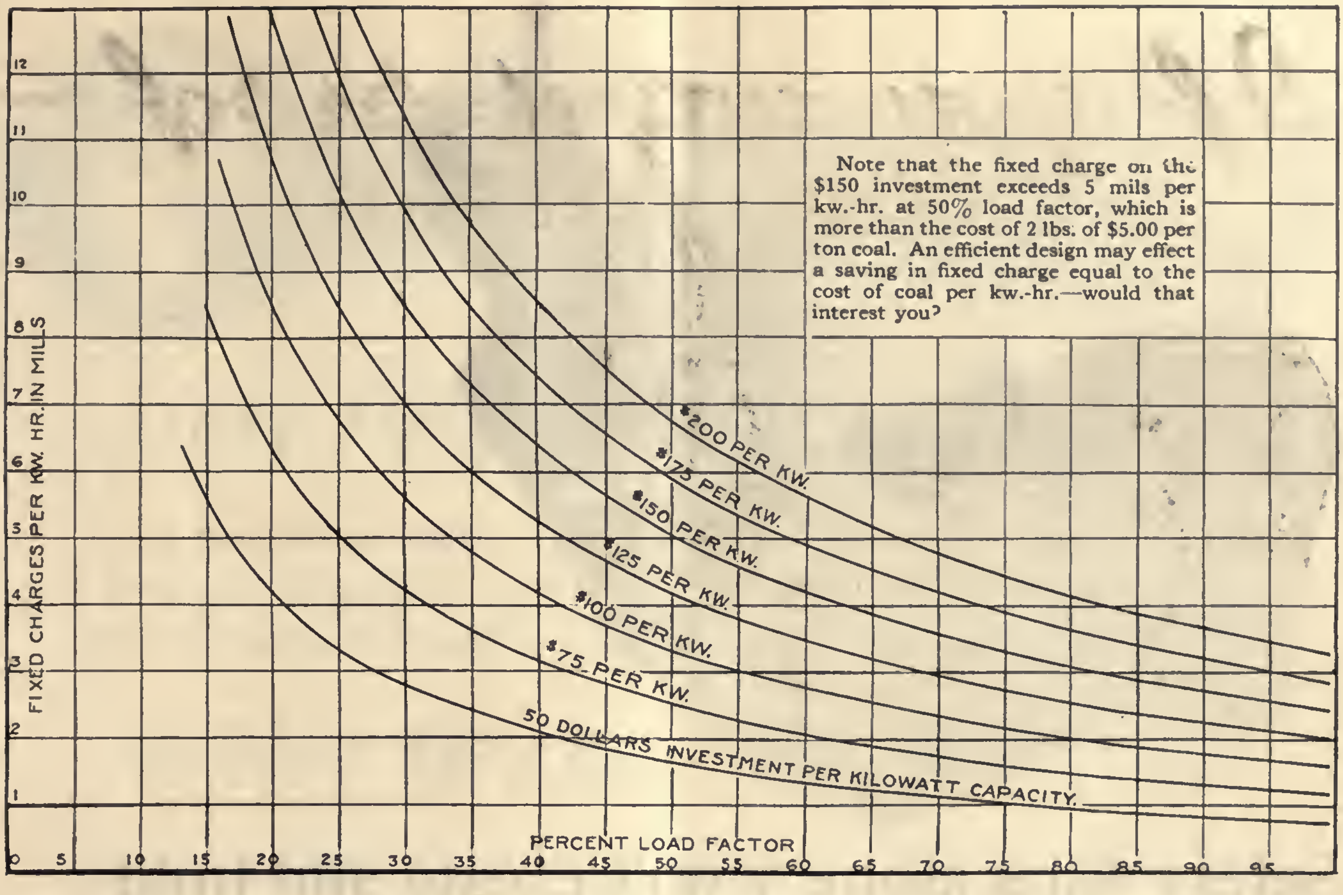
Still, there are probably some people who get out the salt cellar when we talk "3 to 10% increase on gross."

Possibly some of these people want more "proof." That's easy. All they have to do is ask for it. Our files are full of *proof*—proof that *proves* and leaves no room for doubt or misunderstanding.

Would you like to look over some of these facts and figures? Our Engineering Department is always ready to supply them. Write today—just say "Send me all the facts."

JOHNSON FARE BOX COMPANY

Ravenswood, Chicago, Ill.



Note that the fixed charge on the $150 investment exceeds 5 mils per kw.-hr. at 50% load factor, which is more than the cost of 2 lbs. of $5.00 per ton coal. An efficient design may effect a saving in fixed charge equal to the cost of coal per kw.-hr.—would that interest you?

Beware the Cause of High Fixed Charges

FIXED charges are established—for all time—when the initial plan and design of a power plant is determined on. A heavy investment is a great burden upon generating costs. No amount of managing or supervising talent can change the fixed charge part of power costs after the plant is built. These curves are based upon a total annual fixed charge of 15%, an average figure representing considerable increase over that of a few years ago. We may expect substantial decrease in operating costs involving fuel and labor but it will be a long time before fixed charges return to former levels. We have evolved after many years of experience, designs that admit of building efficient power plants at low unit costs.

In this connection we offer our experience and services in the design and construction of Unit Power Plants—a design that may be built in units or sections, each section complete in itself and able to render efficient, reliable, low-cost service with minimum investment.

Without obligation or cost on your part we would be glad to make preliminary recommendations on your problems. Write for Booklet A.

E. W. Clark & Co. Management Corporation
Columbus, Ohio
Management, Engineering and Construction of Railway, Lighting and Power Property

Safety Cars alone won't create and hold traffic—it's the headway that counts—

U. S. Electric Signals

make Safety Car service safe on single track lines, no matter how short the headway—no matter how frequent. They give, in reality, two-track results with one-man cars.

The records of thousands of U. S. signals operating for big cars and heavy service are a sufficient guarantee that they will meet any conditions you may have to set for the operation of small cars in light service. Send us a diagram of your track layouts and a statement of the schedule desired. We'll take the next step gladly.

A generation of success in signal specialization stands back of United States equipment.

United States Electric Signal Company
West Newton, Massachusetts

Representatives:
Western: Frank F. Bodler, Monadnock Bldg., San Francisco
Foreign: Forest City Electric Services Supply Co., Salford, England

ACKLEY BRAKES
Found The World Over

Most People Regard a Brake

as a means of stopping a car. But the forward looking executive realizes that an adequate brake means higher speeds and more revenue.

Ackley Brakes Are Adequate

to take care of the most stringent calls that may be made upon them. Rigid, powerful and quick acting, any Ackley Brake is a store-house of pent braking energy that upon demand will control the heaviest and speediest equipment.

Ackley Brakes

permit increased revenue with safety.

Specify for new and rebuilt equipment

Ackley No-Staff—Bulletin D
Ackley 2-E (Staff)—Bulletin E

REPRESENTATIVES:
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A. W. Arlin, Pacific Electric Building, Los Angeles, Calif.
Power Equipment Company, Oliver Building, Pittsburgh, Pa.

ACKLEY NO-STAFF TRADE BRAKE MARK

ACKLEY BRAKE & SUPPLY CORPORATION
G·S·ACKLEY & COMPANY. REPRESENTATIVES
50 Church Street, New York U.S.A.
Agencies throughout the World
Cable address "Acklebrake"

ACKLEY 2-E BRAKE

They're always "on the job"

LITTLE GIANT Electric Track Drills are seldom seen idle: First, because users once realizing their indispensable utility, keep them busy. Second, because their sturdy, highly perfected construction resists wear and severe service even in the hands of unskilled operators.

Over 1200 Little Giants now in track drilling service are performing the work *ten to twelve times faster* than old-time hand methods at a saving of 85 to 90% in cost.

Put them on *your* Spring construction and repair work. Ask for bulletin.

Illustration shows Little Giant Track Drill on the Georgia Railway and Power Company property, Atlanta, Ga.

Chicago Pneumatic Tool Company
Chicago Pneumatic Building . 6 East 44th Street . New York

*Sales and *Service Branches all over the World*

EL-31

*Birmingham
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*Pittsburgh
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Salt Lake City
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Tucson
Barcelona
*Berlin
Bombay
Brussels
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Christiania
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Lisbon
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Milan
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Osaka
*Paris
Seoul
Tokyo
Toronto
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Winnipeg

BOYER PNEUMATIC HAMMERS··LITTLE GIANT PNEUMATIC AND ELECTRIC TOOLS
CHICAGO PNEUMATIC AIR COMPRESSORS··VACUUM PUMPS··PNEUMATIC HOISTS,
GIANT OIL AND GAS ENGINES ROCK DRILLS ·· COAL DRILLS

LITTLE GIANT
Electric Tools

The World's best Lubricants

GALENA QUALITY

A five cent cigar
and
A gallon of oil

Picture a discriminating smoker choosing a cigar because of its size or the color of the band; there are many five-centers as large as the finest perfectos.

Likewise with lubricating oils — it is not the bulk, but the *quality*, that counts! The gallon measure is but the gauge of quantity, while quality —the real test of value—must be measured by the units of lubrication the gallon contains. Modern business efficiency establishes correct proportions that facts may be properly weighed and balanced. Railroads keep records of costs, of mileage and of materials used.

By these records—on the railroads of the North, South, East or West—the *Galena gallon* shows its quality value in lubrication units by ability to give much greater service than the gallon of the ordinary lubricant.

Galena Oils welcome the tests of actual service and stand on the open records of real performance figures, on the principle that no fairer standards can be used as measures of true worth and value.

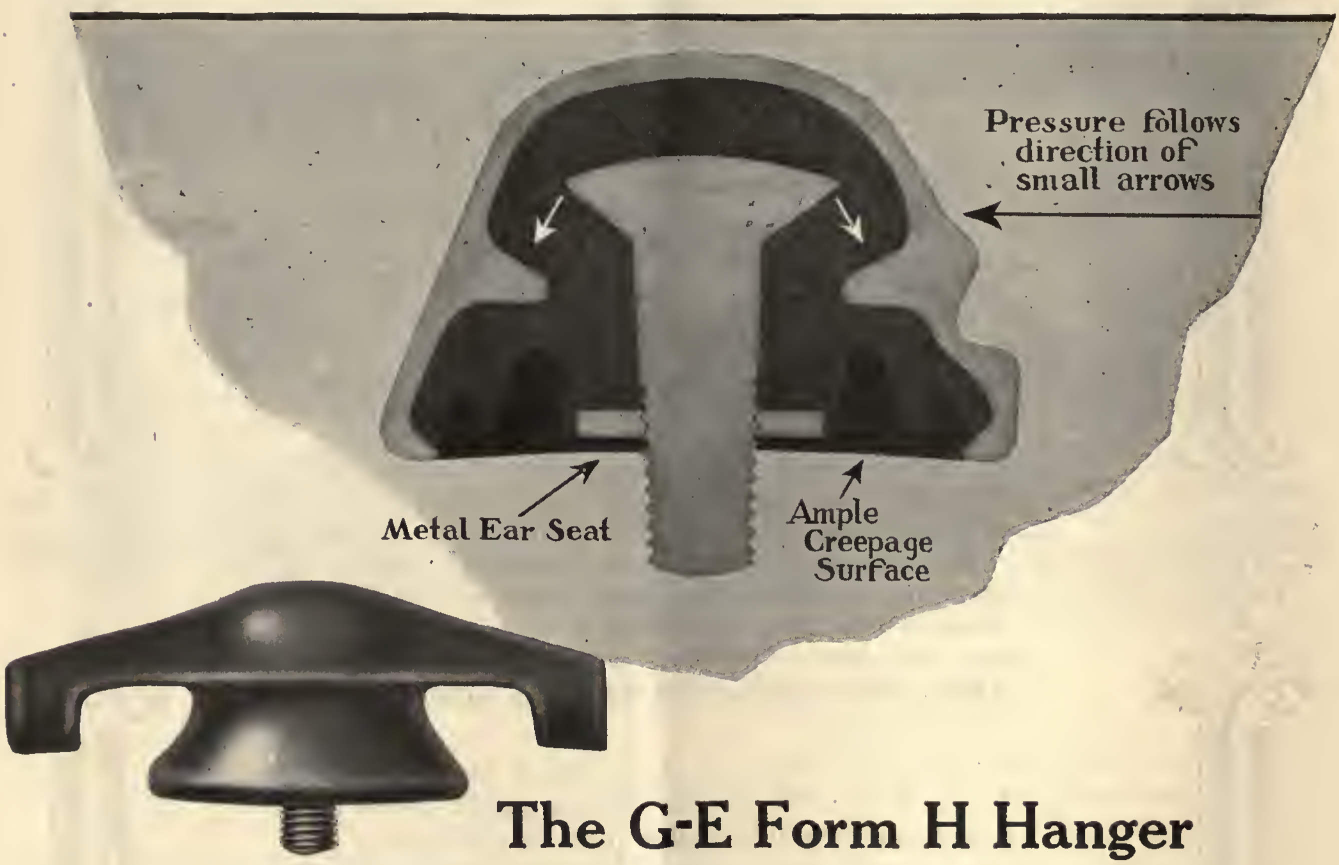
Buy Bulk and get Oil.
Buy Quality and get Lubrication.

TRIGRAM G S O C TRADE MARK

THE GALENA-SIGNAL OIL CO.
NEW YORK FRANKLIN, PA. CHICAGO
Offices in all principal American Cities.
LONDON BUENOS AIRES PARIS

GALENA SERVICE

Durability is not alone a matter of quality of materials—details of construction have an even greater effect upon the life of a product.



The G-E Form H Hanger is designed to give maximum strength

When selecting a hanger for use in the overhead it pays to look closely into the inside construction.

Form H Hangers are built for long life — note the shape of the metal shell as shown in the cross section drawing above. The strain of supporting the trolley wire does not fall on unsupported moulded insulation; sturdy metal projections on the inside of the shell reinforce the compound making the strain one of compression — the bolt cannot pull out in service.

Note also the metal ear seat and ample creepage surface, other superior points of this hanger. The form H, as all other G-E line material, is sherardized by the G-E electric oven process giving positive protection against weathering.

Specify G-E Line Material for durability

General Electric Company

General Office
Schenectady, N.Y.

Sales Offices in
all large cities

40-137

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

HENRY W. BLAKE and HAROLD V. BOZELL, Editors   HENRY H. NORRIS, Managing Editor
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Public Function of Railway Emphasized at Conference

THE midyear meeting of 1921 has passed into history. The wisdom of the selection of Chicago as the convention city was shown by the large attendance, although it is probable that there would have been a great many delegates present even at a city less accessible because of the great interest felt in the topics which made up the program. The conference reflected a feeling of confidence that each succeeding month will bring the condition of the electric railways nearer to that sound basis which is necessary for the good of the communities served. Obviously the discussion of the reports of the federal commission and the Chamber of Commerce committee in the afternoon emphasized the public nature of railway operation and the need on the part of the public for a clearer perception of its status. The public must understand that the business differs radically in its nature and in its possible profits from that of an industrial or mercantile enterprise. It is performing a public duty though under private management. This conception of the railway and its function is now generally accepted within the industry, but only faintly understood outside except where it has been particularly emphasized by some such action as that wherein the state has assumed responsibility for continued operation or where service-at-cost franchises are in force. But it is true, no matter what the franchises may be, and the principal work before the industry at present is to spread this thought and then to bring about a condition by virtue of which the capital necessary to furnish the required facilities will be provided.

How Can the Railways Solve the Financing Problem?

ALL WHO could attend the Chicago conference, and all who have had an opportunity to read the papers presented there, must admire the frank and clear presentation of the subjects by the various speakers. At this writing, which is early in the week and before the conference, no reflection of the association's discussion or action can be made. But, thanks to the commendable policy of printing and distributing the formal addresses long enough beforehand to encourage discussion at the conference, these addresses are available for comment now.

It seems somewhat trite to repeat the statement that the industry's financing is in a serious condition, and that a discussion of "Electric Railway Financing" is timely for the industry even though not new. But it is pertinent to point out that the inter-relation of the problems of financing and of the furnishing of adequate transportation to the public—the only real reason for the existence of the electric railway—is so strong and so close that a complete setting forth of the situation as at Chicago is well worth while.

The addresses presented, showing as they do both past and present phases of financing, form a composite picture which should be considered as a whole to see the effect one element has on each other. The turn of the railway business from a private construction and pioneering, and actually risky, business into a recognized essential service has changed the situation. The risk is not yet gone, but the speculative feature has been largely eliminated. Necessary as early day financing methods may have been in order to develop the electric railway, the present day problem is the one to be met.

The subject as presented divides into two general classes—the marketing of senior securities and the marketing of junior securities. Both problems are serious in that, as both Mr. Shrader and Mr. Corey point out, the industry as a whole is topheavy with senior securities. Mr. Corey says a 35 per cent to 40 per cent interest payment is conservative, 75 per cent impossible. The senior security market demands that the debt be a smaller part of the total capitalization. New money won't come in through junior securities to create new capital merely to improve the bond market. The depreciated physical property must be maintained—be brought back to a satisfactory condition—in order to build up the security for the bonds, even. To do this, as is well known, more net revenue must be obtained. Better service with present equipment, merchandising, more transportation, increased operating economies, all these will help. A fare which is really reasonable must be maintained and the public must further do its part to assist in making the service really economical through elimination of irrelevant costs.

But there are some things which the railways can do in the financing program. The speakers call the present financial structure a patchwork and say it must sooner or later be recast. It seems pertinent to inquire, "If eventually, why not now?" An understandable financial scheme is conducive to success in home-town financing. As Mr. Way well says, this is a new kind of business as conducted today, a thing for the railways themselves to undertake. He also says that this can, however, only help, not solve. From the standpoint of supplying all the money for junior financing, this may be true, but successful home-town financing has a far greater effect than the immediate supplying of money. The community's continued interest, practically assured by its purchase of securities in any considerable quantity, is a strong producer of confidence in the man at a distance who is solicited for the purchase of similar securities.

Finally, direct municipal aid is suggested. This seems to be too impersonal. The difference between that and municipal ownership is not great and, except in proportion to the actual benefits received by the city as a whole, is difficult to substantiate. Mr. Traylor's suggestion is practically a modified service-at-cost arrangement with sliding scales for rates, employees and capital. This is a form of franchise, but yet does not solve the financing. It is an aid in the sale of capital shares, which is the problem of the industry today.

Fares and Other Factors in Traffic Growth

IN THESE days of changing business conditions, changing fares and changes in traffic, there is danger that incorrect deductions will be drawn of the reason for variations in the number of passengers carried. As we have said before, a change in fare is many times an important factor in determining the amount of business done by an electric railway, but it is not the only factor and in many cases it is not the most important factor. For this reason the experience in one city with a change of fare is not an unerring guide to the results which may be expected from the same increase in another city.

One company in a small city which was anxious to know exactly what the effect on its traffic would be from different fares received the following advice from a consulting engineer:

"Run one typical day absolutely free, merely registering the traffic for the sake of the passenger count. Charge a fare of 1 cent the second day, 2 cents the third day, 2½ or 3 cents the fourth day, 4 cents the fifth day, and so on until you have reached a prohibitive maximum. By that means you will learn how many people really can make use of your facilities under known weather and industrial conditions, and you will have a firm foundation for trials of cash fares, ticket fares, off-peak fares, unlimited ride tickets, etc."

We are sorry the client did not have the courage to try this step, although we acknowledge such rapid changes in fare would have been rather demoralizing for the public and a not very satisfactory means of determining the critical fare, as the public are not automatons. Undoubtedly the free day would have developed a large number of short distance riders, just as the ordinary person will use an elevator to descend two or three flights of stairs when it is just about as easy and quick to walk. But this does not mean that such a rider is a possible patron if any charge is made for a ride. This is one reason why the plan of free railways, as recommended by Mr. Bauer of Lynn is not practicable. The cars would be so crowded by those who did not need to ride as to keep off those to whom transportation is a necessity. This difficulty actually arose at Glasgow, where the halfpenny riders crowded off those who really needed the service.

Now let us consider the second point made, *i.e.*, that the fare is by no means the only factor in causing traffic changes. The truth of this proposition is just as important as that first mentioned, but is probably not so generally understood. Nevertheless, there are many examples of cities where increased service and short headway by one-man cars or some other means has greatly increased the traffic, even in spite of an increased fare. Terre Haute is a good and well-known example. Another is shown by the way in which patronage seems immediately to come to every new rapid transit line developed in New York. The greater part of this traffic is not diverted, to all appearances, from parallel lines, but represents the readjustment of transportation conditions throughout the metropolitan district; that is to say, residents flow into the territory served because transportation is available.

A factor in traffic growth too much neglected in the past is the way in which transportation is merchandised. If the public can be made to realize that transportation is a money saver to them or in other ways is advantageous, and particularly if the "riding habit" can be developed, there will be an increase in the riding from that cause alone, independent of any reduction in fare. This has really been the main thought back of the sale of unlimited ride tickets where they have been installed. The price set has been based usually upon a daily use of the ticket at least three times; that is to say, a passenger who rode only three times a day would not save money, but every ride beyond that number would be practically without charge. The company therefore gained partly by stimulating rides (usually in the off-peak hours) which the holder would otherwise not have taken and partly by encouraging him and others in the riding habit.

The Canadian Association Emerges from Its Seclusion

THE Canadian Electric Railway Association has previously been a somewhat close corporation, as it had a perfect right to be. At the recent Ottawa convention, however, a new policy was inaugurated. Supply men and other erstwhile outsiders were invited to attend the convention, to take part in its proceedings and to join the association through the companies with which they are affiliated. The result was very satisfactory and, to judge from the comments of men who had attended many meetings, the Ottawa "guests," as all newcomers were designated, formed a distinct addition to the convention. The electric railway industry in Canada will benefit by the inauguration of the new policy and the railway companies in the United States will follow with greater interest than ever the proceedings of the meetings of their brethren across the international boundary.

The Ottawa meeting was unique in more than one particular, but an outstanding feature was the fine spirit which existed, and was manifested, between the representatives of the public and the managers of the privately owned and privately operated electric railways. Canada is, of course, the home of more municipal electric railways than the United States, measured numerically, and relatively they are still more in evidence. When Toronto takes over its railway system, which will presumably be next fall, the municipally operated mileage in the Dominion will be considerable. Hence it is highly important for the Canadian Association to keep in close touch with this phase of the industry's development. The election of H. H. Couzens, of the Toronto Transportation Commission, to the executive committee shows that this fact is appreciated.

The discussion at Ottawa demonstrated very clearly the gain that is possible through close co-operation between the public, through its representatives, and the companies. Take, for example, the matter of traffic regulation, a topic which attracted several police chiefs to the convention. While the paper on this subject actually was not discussed, the guardians of the peace and of the public safety could not but get somewhat of the electric railway aspect of the problems which confront them jointly. Another example was service at cost. Montreal is getting good tramway service at cost from a privately owned and operated property; Toronto is to get the same thing from one publicly owned and operated. Attendants at the meeting who heard Mr. Couzens, Col. J. E. Hutcheson of the Montreal Tramways, Dr. L. A. Herdt of the Montreal Tramways Commission and others discuss this subject from all points of view could readily see that, granted the service-at-cost principle, it matters little who sits in the front office provided politics is eliminated and first-class operating talent is employed. It is particularly urgent in Canada that the essential unity of the industry be recognized so that the development of antagonistic camps be not permitted. The association will be a powerful factor to this end.

Engineering Opinion Should Be Free from Prejudice

AT A RECENT meeting of an important committee of the Engineering Association the effect on technical progress of one-sided views held by some engineers was brought out forcibly. The point was that men are apt to think highly or otherwise of a thing or a practice because with them it may respectively have succeeded or failed. Such short-sighted reasoning, or lack of it, is contrary to the standards of engineering thought. It often happens that some particular device or a given procedure is adopted practically by accident. A good salesman drops in and puts up a convincing argument in favor of something that he is pushing; or urgent necessity compels the trying out of some new "stunt" to accomplish a desired end. This is all right as far as it goes, but it does not go far enough. The real engineer realizes the importance of an all-round knowledge of every proposition for which he is responsible.

It is just here that the committee work of the Engineering Association is most effective. Generally speaking, its standards, recommended practices, and specifications are prepared in the light of rather full knowledge. It is the part of wisdom for the members to be familiar with and to apply the results of this constructive work.

Farmers Indorse Electric Freight Transportation

TRANSPORTATION service is the only commodity which the ordinary railway has for sale. For any commodity to be salable it must be right in kind, quality and cost. Some electric railways now offer several kinds of transportation service for sale, but the industry as a whole has pinned its hopes too exclusively on the service of transporting passengers.

That people do want other kinds of transportation service and are willing to fight tooth and nail to obtain it was evidenced last summer by the activities of the Indiana Federation of Farmers' Associations in securing the special legislation necessary in order that the interurban railways of the State might haul live stock over tracks on city streets. These activities resulted from the appreciation of the farmers of the quality of the live-stock transportation service that the electric railways could offer. One of the large sources of loss to the live-stock shipper is the reduction in weight which animals undergo when in transit for any extended period. When one of the interurban railways of the State showed that it could load a car of live stock and deliver it at a depot stockyard nearly 50 miles away in about two hours and a half and, further, that arrangements for such a shipment could be put through in twenty-four hours or less the farmers of the State began to be interested. On the steam roads the corresponding transit time was from one to two days and it usually took a week to make arrangements and secure the necessary car space. The electric service was also much superior to motor truck service both in speed and cost.

When it was found that the service could not be extended to other lines because of statute limitations the farmers' organizations proceeded to have the limitations removed, even going to the extent of forcing attention to the matter at a special meeting of the Legislature, which had been called together to consider other matters. The farmers fought for something which was of value to them, but their action benefited the railways also.

Practically every community has undeveloped transportation service possibilities within its midst. It is up to the electric railway, as the biggest local transportation service merchant, to develop and sell this service. But in the development and sale of the service mutual benefit must arise. By and large the public will co-operate with any honest and useful industry, but it will not do all of the co-operating.

One Indisputable Field for the Bus

FUR and feathers will fly thick and fast during the coming year or two between the advocates of rail and rail-less transportation, particularly as the automotive interests have discovered that the public utility field is one well worth going after even if its demands are not going to be measured in millions of units. We hope and expect that the discussions will be within the bounds of good sense and good taste, for, as the somewhat late Sir Roger de Coverley so sagely remarked, "There is much to be said on both sides."

There surely is room for legitimate differences of opinion where the cold figures alone do not tell all the story. We may prove to a certainty that an electric railway need charge only a 7-cent fare for a certain service, when along comes an experienced bus operator who charges 10 cents, but gets the business because he has introduced the new element of superior speed. So, too, at the top of the traffic scale, we might figure that half a dozen parallel bus lines as regards initial investment would be cheaper than an equivalent capacity of underground or elevated railways, but we cannot doubt that the unhampered track transportation would be most satisfying to the public because of the same element, namely, speed.

An example of the indisputable superiority of one kind of transport over the other at the bottom of the traffic scale is afforded by the small bus lines that reach out over trackless highways from some market town to the villages and farms within, say, two hours' ride. In the old days some promoter would have seized upon such situations to build an electric railway that could not possibly pay. Today one, two or three buses a day suffice for a beginning, and no great harm is done if the district does not make good, because the bus simply heads for new fields to conquer. The local electric railway does not suffer a bit. On the contrary, the buses bring new buyers into the town. In one city of 40,000 seven lines operated by as many owners bring 150 to 300 people into town every day for business or pleasure—the latter aspect being proved by the enlarged traffic on Saturday nights, when the "hired man" and his best girl want to see another installment of the "Lucubrations of Lulu" or some other movie epic. In this particular city the buses used to make a nuisance of themselves by using the downtown public highway as garages. When the City Council ordered them off, the Chamber of Commerce went to the trouble of renting a waiting room and terminal space in the firm determination that they would keep their visitors from the mail order house and the stereoscope. Today this building is self-supporting.

As already noted, such a bus service is a benefit and not an injury to the local electric railway. The only question that arises is whether the railway itself ought not to develop and co-ordinate services of this kind. It will be observed that while there are seven different routes, each is so small that it is really a personally conducted affair of but one to three machines apiece. Perhaps, if all the buses were of one type and handled from one garage, fares could be a bit lower, service more reliable and better provision made for fluctuations in traffic. From a study of the results of small motor bus operation elsewhere, however, it seems probable that the time for company operation becomes ripe when the driving is done by an employee instead of by the owner himself or by some member of his family. In any event, there are already hundreds if not thousands of such services in the United States, and their development is worth watching by the more experienced railway man, who realizes that the only logical trend is toward the operation of all mass or popular transport under one direction.

Car Cards Should Be Used for Merchandising Transportation

THAT the advertising racks in the street cars are one of the best existing mediums of advertising has long been recognized by national advertisers. Local merchants in the territory served are also fast becoming acquainted with the value of this medium. Why, then, do so many railways sell all this space and then spend large amounts for display advertising in other mediums that do not have anywhere near the circulation that can be reached daily by its own cars?

Space in newspapers lasts only for the day of issue, and it is impossible to reach every one thoroughly by a single display advertisement. Many people who read the daily papers also fail to read the advertisements, no matter how much time has been spent in setting them up in an attractive manner. As a general rule, however, while on the cars passengers have nothing to keep their minds thoroughly engaged, and it is but natural that the car ads attract their attention. Moreover, they are reached during the period when they are using transportation and hence when their minds are open to constructive suggestions or transportation policies and improvements.

Of late some companies have begun to realize what a successful advertising medium they actually have in the cars and have stuck posters on the windows, hung fliers to the strap rail, or tacked cards in the bulkheads when wishing to tell their patrons about a change in service, rerouting, or fare schedules. But permanent racks are better, as temporary notices often mar the car finish and always last a short time only and cause a litter of paper.

Companies are not urged to abandon newspaper advertising entirely but to consider the merits for their particular kind of notices of car cards and then, when advertising contracts are being renewed, to be in a position to say whether or not space shall be reserved in the advertising racks for the sole use of the company.

Keeping up the "Per Cent Condition" of the Pole Line

A POLE line, like everything else, is new but once; to borrow an expression from the vocabulary of the appraisal engineer, it has "100 per cent condition" only once in its life. If it receives no replacements or reinforcements and is fortunate enough to keep out of the way of stray cyclones its per cent condition decreases year by year, slowly at first and with increasing rapidity until it reaches the low level of 40 or 50 per cent, at about which time it can no longer be operated safely. By a proper system of replacement or reinforcements, however, the per cent condition can be maintained indefinitely at some safe operating figure, say between 70 and 90 per cent. Today proper maintenance furnishes one of the big problems of the pole-using public utilities.

By far the greater number of wooden pole lines in this country have been built within the past twenty years and many of them have reached the age where the per cent condition is beginning to decrease rapidly. Most of the poles in these lines have been set without preservative treatment to ward off that chief enemy of the wooden pole, decay. Where decay has not progressed too far the life of the pole can be prolonged by digging away the earth near the ground line, removing the diseased wood, drying the healthy wood and administering a couple of coats of preservative with a brush. Concrete reinforcement is in considerable favor and concrete butts to which the pole is clamped above ground line have been used also. Some companies follow a definite scheme of replacement, replacing, say, every eighth or tenth pole each year, but making no attempt to prolong the life of the poles except by using preservatives on the new pole used for replacement.

The distribution man is often in a quandary as to just which is the best method to follow. As a matter of fact, no one method is best for all conditions of service, soil and climate. All of the methods of prolonging the life of a pole after it has been set are more or less expensive. Brush treatment of such a pole costs from $4 to $10. There is no question but that proper brush treatment does prolong the life of the pole. Likewise, while it is extremely doubtful if the concrete jackets prevent decay there is no doubt but that they strengthen the pole where it has been weakened and therefore prolong its useful life. The all-important question is, do they prolong pole life enough to be worth while? The answer again depends on local conditions. With anchor poles, poles carrying a heavy load or other cases where the cost of a new pole is only a part, and sometimes a small part, of the total replacement charge the expenditure of a considerable sum of money for reinforcing can be justified. With small poles carrying light loads the economy of reinforcement methods may be problematical. In any event, the problem of pole maintenance is important now, when plans for next summer's maintenance work should be under way.

Quotation from the Federal Electric Railways Commission Report

No. 7

RESTORATION of credit involves a readjustment of relations which will remove public antagonism, provide public co-operation and insure to the investor the integrity of his investment and a fair rate of return thereon.

Effective public co-operation should be exercised by eliminating, in so far as it is practicable, special assessments for sprinkling, paving and for the construction and maintenance of bridges which are used by the public for highway purposes.

Symposium on Electric Railway Finance*

AUTHORS
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The Subject Matter of the Chicago Conference Papers Shows How Railways Early Outgrew Local Stock Financing and Sought Loans to Build Extensions; How the Investors Demanded Protection Leading to the Present Requirements for Mortgage Bonds; How Financing by Share Capital Requires Good Margin Over Bond Interest, and How Municipal Aid Can Be Enlisted to Restore the Functioning of Local Transportation Systems to Prevent Community Strangulation

THE technical papers read at the morning session of the midyear conference of the American Electric Railway Association, held in Chicago on Feb. 10, related entirely to "electric railway financing." The program for the meeting had been arranged by the committee on subjects, of which James D. Mortimer is chairman, and an introductory statement was read by him.

Mr. Mortimer explained that this topic was selected because there appears to be none of greater importance to the industry at the moment. The inquiry conducted by the Federal Electric Railways Commission has tended to clear the atmosphere and make such a subject especially pertinent. This report should give satisfaction to every person, no matter what his viewpoint, with the possible exception of the public ownership advocate. The commission advises that capitalization when exceeding fair value should be reduced. The right of labor to "bargain collectively" was supported by the commission and the recognized principle of the right of capital to a reasonable and stable return was enunciated. Methods of attaining these ends were discussed by the commission and the way left open for each company and each community to solve their problems according to their respective abilities.

At present the experienced investor shudders when he is offered traction securities. They have almost ceased to be evidences of ownership and the volume of sales is negligible. Most of the trading is done by exchanging bonds or notes for a receipt issued by some reorganization committee.

These facts are as well known to the investing public and the investment bankers as they are to the people in the industry. We are looking for light on what the industry should do to reclaim itself and for that reason have asked those experienced in the manufacture and sale of electric railway securities to tell us what must be done to rehabilitate railway credit. With credit the companies can get money and with money they can improve and extend their properties and minimize walking and vehicular and other forms of competition. Without money the industry moves backward.

Mr. Mortimer then referred briefly to each paper scheduled. He pointed out that that by Mr. Fogarty is of the nature of history, but history often serves as a guide for future conduct, and many of the errors in early financing arose from inability to forecast the future. For this reason alone Mr. Fogarty's contribution should be valuable, even in the improbable event that the summary of historical practices should prove uninforming.

The task assigned to Mr. Shrader to define the present day requirements for mortgage securities to be readily salable is a difficult one with little or no market for traction securities at present. But Mr. Shrader has been able to give the factors of safety and requirements for stable earnings, and finds that these are really no more severe than those obtaining in respect to other public utility issues. As comparatively few railway companies could meet these requirements, however, it follows that few companies can finance capital improvements even if there were no investors' prejudice.

MUTUAL OWNERSHIP

In connection with Mr. Way's paper Mr. Mortimer pointed out that the investment field at home for utility securities is limitless in its ultimate possibilities, and the improvement in public relations in a few years that followed the sale of a substantial amount of safe securities in the communities served is marked. The direct sale of ideas is difficult. The indirect sale of ideas accompanying the direct sale of goods or securities is comparatively easy. The rules of the large investment houses in the sale of securities do not apply as a whole to this new field. The attitude of mind of the prospective investor does not correspond to that of the experienced client of the investment security house. The typical tabular statement of security characteristics, now standard in financial advertising, is not intelligible to this new class of investor. As a rule, long-time investments are not desired, and ability quickly to reconvert the investment into cash without loss is essential. Mr. Mortimer explained that the field is fertile, yet one where the greatest care must be exercised to avoid both actual and imaginary losses.

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*Abstracts of papers presented at the midyear conference of the American Electric Railway Association, held at the Drake Hotel, Chicago, on Feb. 10, 1921.

SHARE CAPITAL FINANCING

In connection with Mr. Corey's paper, Mr. Mortimer pointed out that Mr. Corey had developed a vital point in electric railway finance, in view of the fact that electric railways are largely owned now by their creditors. The new capital put into the industry during the last fifteen years, represented by shares of stock, is very small. The proportion of debt to the total investment has continued to increase, but the rate of increase has been less during the last eight or ten years than in the previous five or seven years. This decrease in the rate of increase of debt has been due in part to the inability to sell any kind of capital securities, and if the investing public will not purchase the interest bearing securities of the industry how can investors be expected to purchase junior securities, such as preferred shares and common shares? If a part of the new capital must be provided by the sale of capital shares, Mr. Mortimer said, it follows that financial reorganizations are necessary in a great many cases before the credit of the industry as a whole can be restored. This conclusion seems to be implied in Mr. Corey's discussion.

PUBLIC AID

Mr. Traylor's paper outlines the various forms of public aid, from desirable favorable public opinion to necessary public ownership. If the politicians do not face the facts and adopt the solution which such facts suggest they will have a far more serious difficulty on their hands in taking care of the problems of publicly owned utilities. They will lose a good political issue and at the same time have to carry the responsibility for inadequate street car service. As Mr. Traylor suggests, the disease will cure itself in time if the industry can survive during the period of treatment.

ARE FINANCIAL REORGANIZATIONS NECESSARY?

In conclusion Mr. Mortimer says:

> These several addresses all lead up to the question, "Are financial reorganizations necessary?" The question can be answered in either of two ways, except in the cases of those companies now undergoing the process of adjustment of their capital securities. It can be answered generally in the negative if we are to be satisfied with a policy of no expansion and a repetition of the experiences of the last ten years. It will have to be answered generally in the affirmative if the implied conclusions of the Federal Electric Railways Commmissison are accepted and if the credit of the industry is to be completely rehabilitated. Partly because of the comparative ease in answering the question and partly because of the short time available for a relatively long program, formal discussion of this query was abandoned by the committee on subjects.

Previous Methods of Railway Finance

An Outline of the Financing Methods Used from the Horse Car Days to the Present Time, with Comments as to Future Financial Methods with Guaranteed Returns on Fixed Values.

By JAMES F. FOGARTY

Secretary the North American Company

THREE decades have passed since electricity first succeeded the horse and cable as motive power in the field of street railway transportation. Not only has the old motive power been supplanted but there remains relatively little of the old plant except the franchise in some few cases. The amount of capital invested has greatly increased, but the business seems to be far less profitable today, in proportion to the capital invested, than it was when motive power carried names and had dams and sires.

The advent of electric power marked the departure from the practice of financing largely by capital stock, owned by a comparatively few people, and by earnings. It meant that the creation of security liens on physical property with a wider distribution of ownership came into prominence. Large sums of money were spent to bring about unified urban systems, successful independent lines and routes had to be purchased, electricity was substituted for horse and cable, new franchises were needed, and these contained expensive restrictions and provisions. Each successive step in the development was attended by large equity losses in discarded property, entailed substantial expenditures for replacements and additions and rendered necessary unceasing effort to procure capital under perplexing and changing conditions, made difficult by growing competition for funds from other fields. It is not surprising, therefore, that there were erected many financial structures which subsequently collapsed under their cumulative burdens.

The necessity of large future capital expenditures had not been clearly foreseen in the infant stages, and the early bond issues were almost invariably limited to small authorized amounts, exhausted before much progress had been achieved in development, as measured by present-day standards. When the era of consolidation was reached, therefore, there were outstanding closed mortgage obligations for which provision had to be made in addition to financing the costs of consolidation and further extensions of property. Out of this condition there came the refunding bond, of lien junior to the original or underlying issues, chiefly a second mortgage. By virtue of its character, the salability of such a security was more limited, and it became necessary to

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JAMES F. FOGARTY, secretary the North American Company, New York City, has been connected with that company for the past eighteen years. He entered the New York office in 1903. In 1910 he was appointed assistant secretary of the North American Company and the Milwaukee Electric Railway & Light Company, and in 1911 was made secretary and assistant treasurer of both of these companies. Soon after, he also became assistant treasurer of the Union Electric Light & Power Company, St. Louis, and the Wisconsin Gas & Electric Company, both subsidiaries of the North American Company. In 1915 he became secretary of the Detroit Edison Company. Mr. Fogarty is a student of financial plans and as such has given much thought to the problems of the public utility company, particularly as to reorganization plans. At the 1914 convention of the American Electric Railway Accountants Association he presented a paper entitled "The Accounting Treatment of Bond Discount," which has since become an authority on that important subject issue additional amounts of preferred and common stock as inducements to prospective purchasers.

The early years of the period 1890 to 1900 were marked by feverish intensity of promotions, consolidations and electrification, and the ensuing general business depression, which reached its maximum in 1897, was the forerunner of the first important traction reorganizations. The rebound which followed was accompanied by the lowest interest rates in the history of the industry, inducing rapid expansion and the development of interurban lines.

Various means were employed to effect amalgamations of financial structures as well as physical consolidations of separate lines. Refunding mortgages were created and by the deposit of escrow bonds of underlying issues became partial first lien. Collateral trust issues found markets abroad and large amounts of English and German capital were invested in these securities. Preferred and common stocks were issued to equalize differences in earning power of the various lines, acquire control and to provide equity not contributed through the sale of bonds. In the early '90s the holding company appeared, in some cases confined to the control of a single system, in others of several systems. It afforded a practical method of pooling interests and played an important part in centralizing control of properties later actually consolidated or leased under guarantees of fixed returns.

Some of Mr. Fogarty's Conclusions

Before the coming decade has rolled by refunding of large amounts of pre-war, wartime and post-war financing will have to be met and it is not unlikely that many financial reorganizations of electric railways will have taken place.

Future financial methods of electric railways will bear little resemblance to those of the past. Service-at-cost franchises may stimulate the interest of the investing public. Some assistance may be obtained by assessment of costs of extensions against abutting property owners or other beneficiary interests. Local sales of securities offer some possibilities. A security guaranteed by or carrying the faith and credit of the communities served may be the only solution if corporate ownership is to continue.

Measured by the standards of "cost of reproduction new," there is no doubt that the unified systems at first were overcapitalized, but measured by actual cost and benefits derived by the communities from the consolidated facilities the resultant capitalization, generally speaking, was not excessive.

Among the first of the electric railway consolidations was that in Milwaukee. There, also, occurred one of the first receiverships of a consolidated system and the first attempt to appraise and recognize consolidation costs. W. J. Clark of the General Electric Company, in testifying on the then reproduction cost as compared with cost investment of earlier years, stated:

> Probably on no large electric street railway system in the United States is there the necessity to charge off to depreciation so large a percentage of its original cost as in Milwaukee. The system having been constructed at an early period of electric railway development, when everything necessary to construction and equipment was far higher in price than at present, the company has naturally to meet a great shrinkage in values from decline in cost prices alone, while depreciation arising from usage has proved to be far greater than was estimated upon even as recently as two years ago. From the above two sources, neither of which could be estimated, appreciated or anticipated, it is safe to say that there has been an average shrinkage from the original costs on all of the company's physical property, outside of real estate and buildings, of more than 50 per cent.

Of that case, Judge Seaman of the federal court said:

> . . . I am satisfied that the property of complainant represents a value, based solely upon the cost of reproduction, exceeding $5,000,000. And I am further satisfied that this amount is not the true measure of the value of the investment in the enterprise. It leaves out of consideration any allowance for necessary and reasonable investment in purchase of the old lines and equipments, which were indispensable to the contemplated improvement, but of which a large part was of such nature that it does not count in the final inventory. No allowance enters in for the large investment arising out of the then comparatively new state of the art . . . I am clearly of the opinion that at least $2,000,000 of those preliminary expenditures is entitled to equitable consideration, as so invested, beyond the reproduction value . . .

This evidence is an illustration of the costs which are attendant upon consolidation and the methods of financing them.

Restoration of confidence in electric railway securities followed the business revival after the depression of 1897. Cheap money made refunding issues bearing interest as low as 4 per cent salable and promoters were encouraged to exploit new fields. The interurban railway promotions of the late '90s were the result of this combination of circumstances. The financing of the interurban lines differed from that of the urban systems in that it was possible from their inception to utilize first mortgage liens. The expected prosperity of the interurban lines failed to materialize, however, and with few exceptions their bonds became less popular and were salable only at increasing discounts. The succession of events from 1901 to 1910 was somewhat similar to that of the preceding decade. The easier money conditions of 1899 continued for several years and were followed in turn by the panic of 1907, which paved the way for a harvest of receiverships within the ensuing few years, notable among them being Chicago, Cleveland and New York.

The participation of electric railways in the prosperity which followed the dark days of 1897 soon strengthened their securities and in 1903 street railway bonds were admitted, under rigorous requirements, as legal investments for savings banks in the State of Massachusetts. Similar action by the legislatures of other states followed. This recognition of street railway bonds as gilt-edge securities, however, induced the imposing of restrictions on new issues. The provisions of some of the mortgages of the pre-consolidation period (1888-1890) and of the time of low interest rates (1899-1900), and of those of the succeeding years, present interesting contrasts and illustrate the growing limitations on the financing of new construction and additions. Instances were not uncommon of mortgages of 1888 to 1890 which permitted bonds to be certified and issued under resolution of the board of directors, merely stating the amount to be issued. Mortgages of five to ten years later required only certification that the cost of property to be constructed or acquired was not less than the proceeds of the bonds to be issued therefor.

During the succeeding years there were gradually introduced provisions which have had a far-reaching effect on financial methods of electric railways. Fixing of maximum interest rate and the requirement that net earnings equal one and one-half to two times the interest charges on all bonds outstanding, including underlying bonds and those to be issued, were among the first of those provisions. Then followed restriction of the amount of bonds issuable to 85, and later to 75, per cent of capital expenditures. Shortly thereafter the requirement that appropriations for maintenance and depreciation of property be not less than certain fixed proportions of revenues made its appearance.

State Regulation Begins

Street railways after 1900 had not long enjoyed the reputation of being prosperous when public reaction toward this condition made itself felt. As early as 1903 agitation arose in Cleveland for a 3-cent fare, and by 1907 state regulation became a fact in New York and Wisconsin.

State regulation has had a marked influence on railway financing. Some of the early decisions, particularly of the commission for the Second District of New York, are classics. These decisions recorded the necessity of assurances that proceeds of security sales would, under rigid accounting procedure, be expended for revenue-producing extensions, and the necessity of earning power sufficient to insure proper return upon investments.

It was expected that assumption by the state of jurisdiction over utility security issues would remove such securities from the speculative class and give them a standing which would attract new capital to the business at lower costs. But the burdens imposed by regulation have remained and increased, while the implied assurances have lamentably failed. Had public regulation completely fulfilled its functions electric railway securities would not now be in such general disrepute.

Cost of Money Increases

The period 1911-1920 was one of steady increases in the cost of money to the traction industry. The bonds of ten representative electric railways sold in 1911 at prices producing an average yield of 4.88 per cent. In 1916 these bonds had fallen to a price level yielding 5.14 per cent, and by January, 1920, had further declined to a 7.10 per cent basis, an increase of about 47 per cent in yield rate in nine years. Preferred stocks of ten representative electric railways which had continuously earned and paid their dividends during the same period declined from a 5.41 per cent basis in 1911 to 6.08 per cent in 1916, and 8.60 per cent in January, 1920, a total increase in yield of about 60 per cent. Exemption of municipal securities from tax burdens and the ability of industrial enterprises to pay higher interest rates and refund tax deductions have contributed to the loss of the esteem which electric railway securities enjoyed in the late '90s.

The violent fluctuations in security prices since the beginning of the World War have had an important bearing on financial methods of all industrial and utility companies, and more particularly street railways. They found themselves unable to obtain funds at rates within the imaginary "reasonable return" to which they were limited by regulation, or within the rates earned under fixed franchise fares. Continuous additions to rolling stock and appurtenant equipment to comply with orders prescribing increased service necessitated the raising of funds in substantial amount. Existence of underlying and refunding mortgages with after-acquired property clauses prohibited the financing of these requirements by first-lien securities, if title to the equipment were vested in the operating company. Hence resort was had to the issuance of securities on new rolling stock owned by a trustee and leased to the company. This device, known as the "equipment trust," was borrowed from the days of steam railroad refinancing. Comparatively new in electric railway financing, the equipment trust has not yet gained a permanent place in the financial structure.

Many of the railways found it necessary to issue notes bearing high interest rates, but limited to from three to five years, as investors were reluctant to tie up funds for long periods. The continuous bidding for capital apparently had fostered the belief that income yields would be in the ascendency for a long time to come, and investors soon turned from three and five year notes to those bearing higher rates but of shorter term to permit more profitable reinvestment at maturity. Such notes required collateral security in the form of pledge of mortgage bonds, usually 125 to 150 per cent of the amount of notes. Assuming, as a hypothetical case, the issuance of 80 per cent, or $800 of bonds against $1,000 of capital expenditures, and the pledge of the bonds to secure two-thirds of their principal in face amount of notes, reimbursement for the $1,000 of original expenditures had to be derived from about $533 of notes, and, after deduction of discount, amounted to but little more than half the actual cash outlay.

After a brief period, realizing that the current high yields were not to be permanent, investors' views underwent another change, and short term notes gave way to notes bearing the same high rates for ten years, and even longer, or to bonds bearing equivalent interest rates, where provisions of newer mortgages permitted them to be issued.

Present Decade Most Important

The decade upon which we are entering will probably be the most important in the history of the traction industry. Before it has rolled by refunding of large amounts of pre-war, war-time and post-war financing will have to be met. Underlying bonds of lines forming the present unified systems, and indeed some of the refunding issues of consolidated companies, will mature within the next ten years. The problem of financial rehabilitation, staggering in itself, is augmented by a discouraging outlook for the procurement of the new capital necessary to provide adequately for normal increases in the business, and it is not unlikely that ere this decade has passed into history many financial reorganizations of electric railways, some voluntary and some involuntary, will have taken place.

Future financial methods of electric railways will bear little resemblance to those which the exigencies of the past have caused to be adopted. Service-at-cost franchises, with guaranteed returns on fixed values, may stimulate the interest of the investing public. Some assistance may be obtained by assessment of costs of extensions against abutting property owners or other beneficiary interests. Local sales of securities in small amounts offer some possibilities. A security guaranteed by or carrying the faith and credit of the communities served may be the only solution if corporate ownership is to continue.

Present Mortgage Requirements

A Satisfactory Franchise, Stable Net Earnings, Reasonable Renewable Property Reserves and a Good Margin of Net Earnings Over Necessary Interest Charges Will Restore Credit to the Electric Railway Industry.

By F. K. SHRADER
Halsey, Stuart & Company, Chicago

THE electric railway business has an invested capital of more than $5,000,000,000 and a gross annual business of more than $730,000,000. Eleven times as many passengers are carried annually as on all the steam railroads combined; in fact,. the elevated and subway lines alone carry more passengers than all the steam roads together. Aside from the mere significance of size the industry is so inseparably bound up with the general welfare of the public that its problems in reality become public problems, and the tendency toward realization of this fact is the most encouraging feature today in the industry's situation.

Statistics of track built, as published by the Census Bureau, show a marked slowing up in the expansion of the business to meet the demands of an ever-growing population. Electric railway mileage in the five-year period 1907-1912 increased nearly 20 per cent, while in the subsequent five years it increased only 9 per cent. Passengers carried and revenue car mileage showed a similar slackening of pace, and without doubt the tendency in this direction since 1917 has been even more pronounced.

Prerequisites Essential to Railway Credit

According to Mr. Shrader, the most essential prerequisite to electric railway credit is a satisfactory franchise situation. Investors are not now in a frame of mind to place their funds in an electric railway property unless they are convinced that the basic rights and privileges to conduct a paying business are fully protected. Two important developments in this field have taken place, viz., the so-called Wisconsin indeterminate permit and the service-at-cost franchise. The flexible fare franchise is without doubt economically correct, but in practice it has not yet measured up to expectations from a credit standpoint. The goal toward which the industry must strive is regulation, practically automatic in its operation and sufficiently responsive promptly to administer adequate relief in periods of high costs, so as to enable the railways to maintain their earning power and credit.

Electric Railways Now Considered Hazardous as Investments

Electric railway securities today are decidedly unpopular with the investing public, due to the many defaults and reorganizations in the past. At present, according to the recently published report of the Federal Electric Railways Commission, nearly 18 per cent of the total mileage of the country is in the hands of receivers, including the properties in many of our more important cities.

The inevitable result of this has been that the electric railway business is regarded by the investing public as more hazardous than that of any other public utility and consequently its discrimination is reflected in the higher rates of interest demanded for capital, if obtainable on any terms, and the constantly narrowing field of investors in electric railway securities.

Operating expenses have been absorbing an ever-increasing proportion of gross earnings and interest charges an ever-increasing proportion of net earnings. Net earnings in 1902 covered interest charges substantially twice over, while in 1917 the ratio was but one and a half, the showing since then undoubtedly being considerably worse. In 1917 the entire industry with an invested capital of $5,000,000,000 paid dividends aggregating barely $73,000,000, and on more than half of the total outstanding capital stock no dividends at all were paid. The financial results as thus indicated are by no means sufficiently encouraging to attract the necessary capital properly to develop our urban and interurban transportation systems. Before this desirable end can be attained or even approached there must be established a period of stable and adequate net earnings after all operating costs have been met, including full allowances for proper upkeep of the properties and maintaining the integrity of the investment therein. I have no patent remedy to suggest to cure the financial ills of the industry. The subject is vastly too complex for any simple solution, and must engage the serious thought and conscientious effort not only of financial leaders and the industry itself but of public authorities as well.

Mortgage Securities

The few suggestions I have to offer relate to mortgage securities and therefore I wish to distinguish such securities as constituting a lien against the property, evidenced by a contract termed a mortgage or trust deed and containing specific terms of interest rate, character of lien, maturity, redemption provisions, conditions governing the issuance of additional bonds, provisions relating to the upkeep of the property, remedies in case of default, and other provisions of similar character. Short term notes secured by specific pledge of mortgage bonds may be classed as of the same general character as mortgage bonds, as essentially they rely for their security upon the collateral pledged. The distinction I wish to bring out is between mortgage bonds and share capital or other forms of so-called junior securities. While the latter occupy a very important position in public utility finance, it is not the purpose of this paper to deal with them except in a secondary way as directly related to the senior securities.

Function of Investment Banker

I have sometimes wondered if the function of the investment banker is at all generally understood. Contrary to the opinion held in some quarters, he does not impose the terms and conditions in the issuance of securities to suit his own particular whims or fancies,

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TABLE I—SHOWING EQUITY REPRESENTED BY EXCESS COST OF PROPERTY OVER BONDS ISSUED BASED UPON THE ISSUANCE OF $100,000 PAR VALUE OF BONDS EACH YEAR

At the End of Respective Years	Bonds Issued at Various Percentages of Cost of Property				
	70	75	80	85	90
First year	42,857	33,333	25,000	17,647	11,111
Second year	85,714	66,667	50,000	35,294	22,222
Third year	128,571	100,000	75,000	52,941	33,333
Fourth year	171,428	133,333	100,000	70,588	44,444
Fifth year	214,285	166,667	125,000	88,235	55,556
Sixth year	257,142	200,000	150,000	105,882	66,667
Seventh year	299,999	233,333	175,000	123,529	77,778
Eighth year	342,856	266,667	200,000	141,176	88,889
Ninth year	385,713	300,000	225,000	158,824	100,000
Tenth year	428,571	333,333	250,000	176,470	111,111
Eleventh year	471,428	366,667	275,000	194,117	122,222
Twelfth year	514,286	400,000	300,000	211,761	133,333
Thirteenth year	557,143	433,333	325,000	229,412	144,444
Fourteenth year	600,000	466,667	350,000	247,059	155,556
Fifteenth year	642,857	500,000	375,000	264,706	166,667
Sixteenth year	685,714	533,333	400,000	282,353	177,778
Seventeenth year	728,571	555,667	425,000	300,000	188,889
Eighteenth year	771,429	600,000	450,000	317,647	200,000
Nineteenth year	814,286	633,333	475,000	335,294	211,111
Twentieth year	857,143	666,667	500,000	352,941	222,222
Twenty-first year	900,000	700,000	525,000	370,588	233,333
Twenty-second year	942,857	733,333	550,000	388,235	244,444
Twenty-third year	985,714	766,667	575,000	405,882	255,556
Twenty-fourth year	1,028,571	800,000	600,000	423,529	266,667
Twenty-fifth year	1,071,429	833,333	625,000	441,176	277,778

but does endeavor to discern and meet the demands of the investing public to the end that capital may be provided for worthy enterprises. The investment banker's most valuable asset is his reputation, as the foundation of his whole business is confidence. Therefore, he is vitally concerned in seeing that the securities he sponsors are safeguarded to the fullest extent. He may rely to a certain extent upon the expert legal, accounting and engineering help he calls to his side, but in the field of economic and business phases of finance the investment banker is called upon to exercise the most unrelaxing care and mature judgment.

In reaching a conclusion upon the merits of a mortgage security there are certain considerations that must be analyzed and weighed. The two cardinal fundamentals of any investment are safety of principal and assurance of income. Safety of principal, aside from general credit considerations, depends in large measure upon the proportion of the loan to the value of the security offered. It is for this reason that in a properly drawn mortgage there is a provision restricting the issuance of bonds as new property is added to a certain percentage of the cost or fair value of such property, thus always maintaining an equity in the property over and above the bonds. The relative size of the equity thus created is determined by the rapidity with which bonds are put out and the percentage at which they are issued in relation to the cost of the property. Table I illustrates the importance of holding down the proportion of bonds issued against additions to property. It also shows the equity represented by the excess cost of property over bonds issued there against, based upon the issuance of $100,000 par value (merely taken as a convenient unit for calculation) of bonds each year. As between the extremes assumed in the table, viz., the issuance of bonds at 70 per cent of cost and at 90 per cent of cost, in the course of twenty-five years there will have gone into the property against the same amount of bonds issued nearly $800,000 more under the 70 per cent ratio than under the 90 per cent ratio.

MARGIN OF NET EARNINGS NECESSARY OVER INTEREST CHARGES

Assurance of income depends upon the ability of the corporation promptly to meet its interest obligations and it is customary to provide in the mortgage that bonds cannot be issued unless the net earnings for the preceding year are equal to a prescribed percentage, say 175 or 200 per cent (usually stated in the form of a ratio—1¾ or 2) of the annual interest requirements. Frequently also the issuance of bonds is conditioned upon gross earnings being equal to a certain number of times bond interest.

Table II indicates the measure of protection afforded by these restrictions as to earnings and interest charges. This table shows that under a specification that gross earnings be six times and net earnings twice the interest charges, the amount of bonds outstanding against the property (assuming they bear 6 per cent interest) would be only two and three-fourths times the annual gross earnings, a very conservative proportion, indeed. Furthermore, under the specification of 6 and 2 just noted there is sufficient margin provided in the structure to permit operating expenses to increase as much as 25 per cent with no increase in gross revenues and still meet interest charges. Taking the other extreme of the table where gross is specified as only three times and net earnings as only one and one-quarter times interest charges, we find the property would then have bonds outstanding to the extent of five and one-half times gross earnings, leaving so little leeway for increases in expenses (or loss of gross revenues) that the property could continue to meet its interest charges under only the most favorable operating conditions; if interest charges were only barely covered the proportion of operating expenses to gross revenues could not exceed 66 per cent.

INCREASING RATIO OF DEBT TO TOTAL CAPITAL

The figures just presented bring out the importance of limiting indebtedness to some conservative relation of its value and revenue producing capacity. Unfortunately the tendency has been decidedly in the opposite direction, but it must be corrected if the proper credit is to be established. To show that the past tendency of financing has been to borrow rather than sell share capital the figures in Table III were prepared. In 1902, 57 per cent of the total capitalization of the electric railways was represented by capital stock, and but 43 per cent by funded debt, while fifteen years later the proportion represented by capital stock had fallen to 45 per cent and funded debt had increased to 55 per cent. A similar situation, although not quite so pronounced, exists in the case of the steam railroads, and it is a pretty generally accepted fact that the decline in credit of the steam roads over the past fifteen years has been due to the tendency to finance through borrowings.

TABLE II—RELATION OF DEBT TO EARNINGS

	Assume {Gross 6 x Int. Net 2 x Int. Amount of Bonds Would Then Be (at 6%) 2¾ Times Gross	Assume {Gross 5 x Int. Net 1¾ x Int. Amount of Bonds Would Then Be (at 6%) 3⅓ Times Gross	Assume {Gross 4 x Int. Net 1½ x Int. Amount of Bonds Would Then Be (at 6%) 4⅙ Times Gross	Assume {Gross 3 x Int. Net 1¼ x Int. Am unt of Bonds Would Then Be (at 6%) 5½ Times Gross
Gross	600	500	400	300
Operating	400	325	250	175
Net	200	175	150	125
Bond interest	100	100	100	100
Balance	100	75	50	25
Operating ratio	66⅔	65	62½	58⅓
Amount expenses may be increased and still meet interest charges	100	75	50	25
Per cent	25	23	20	14
Operating ratio would then be	83	80	75	66

The physical property of an electric railway is subjected to hard usage and therefore deteriorates quite rapidly. The failure to make adequate provision for physical upkeep has caused large losses to security holders in the past and is responsible in no small measure for lack of credit today. The modern street railway mortgage must adequately safeguard the investor in this respect through establishment of a definite maintenance and renewal fund, the operation of which will maintain the property at full operating efficiency. The customary method is to require the establishment of a fund based upon the gross earnings of the property, all current and deferred maintenance, renewals and provision for obsolescence to be charged against this fund, and any unexpended balance to be invested either in improvements to the property against which no bonds may be issued or used to retire bonds. No set rule can be followed in determining the required percentage of gross earnings; each individual case must be worked out on its own basis, taking into account the local factors involved. As a rough indication of the limits, however, it has been found in electric railway operation to require from 15 per cent to 25 per cent of gross earnings properly to provide for full upkeep of the physical properties.

TABLE III—PROPORTION OF FUNDED DEBT AND CAPITAL STOCK TO TOTAL CAPITALIZATION

	1917	1912	1907	1902
Electric railways:				
Capitalization	$5,532,223,818	$4,714,665,386	$3,778,831,901	$2,308,282,099
Capital stock	2,473,846,651	2,379,346,313	2,097,708,856	1,315,572,960
Per cent of total	44.7	50.5	55.5	57.0
Funded debt	$3,058,377,167	$2,335,319,073	$1,681,123,045	$992,709,139
Per cent of total	55.3	49.5	44.5	43.0
Steam railroads:				
Capitalization	$21,092,072,245	$19,752,536,264	$16,082,146,683	$12,134,182,964
Capital stock	9,058,682,733	8,622,400,821	7,356,861,691	6,024,201,295
Per cent of total	42.9	43.7	45.7	49.6
Funded debt	$12,033,389,512	$11,130,135,443	$8,725,284,992	$6,109,981,669
Per cent of total	57.1	56.3	54.3	50.4

SINKING FUNDS NOT ADVISABLE

Sinking funds are found in some of the earlier electric railway mortgages, but the present tendency is to omit them, on the theory that an electric railway is permanent property and not of a wasting character. Moreover, it would be an injustice to the public to be charged rates which would retire the indebtedness created to build a property, and thus leave the property free of debt in the hands of the stockholders. On the other hand the investor must be safeguarded, and this can be accomplished only, first, by seeing at the outset that the bonded debt is not excessive in relation to the value of the property; second, that this equity once established is maintained, through financing a considerable proportion of the new money requirements on junior securities, and, third, that the physical condition of the property is kept up to a high standard through adequate appropriation of earnings for this purpose.

COMPLICATED FINANCIAL STRUCTURES

An impediment to economical finance often met in the electric railway field is the complexity of the financial structure. The earlier mortgages, with their small authorized issues and fixed rates of interest and maturities, were inelastic and not capable of expansion to meet the growing needs of the properties which they covered. The result in a great many cases is a patchwork of finance which sooner or later must be recast into a simple structure capable of expansion to meet the financial needs of a growing property. The modern mortgage therefore provides for either a very large or an unlimited authorized issue, emissions therefrom to be issued in series from time to time as the needs of the corporation may dictate, each series to be of such amount, to bear such rate of interest, to mature at such date, to be redeemable at such time or times and at such price or prices as the board of directors of the corporation may determine at the time of issuance. The issuance of these bonds is conditioned upon the observance of fundamental restrictions as the proper relation of debt to property values and earnings, but the purpose is to extend to the corporation the maximum degree of flexibility in its financing consistent with adequate protection to the security holder and thus enable the corporation to economically finance its requirements under changing conditions.

SATISFACTORY FRANCHISE NECESSARY

Perhaps the one most essential prerequisite to street railway credit is a satisfactory franchise situation. Investors are not now in a frame of mind to place their funds in a street railway property unless they are first thoroughly convinced that the basic rights and privileges to conduct a paying business are fully protected. In recent years two very important developments in this field have taken place, viz., the granting of so-called indeterminate permits, as practiced in the state of Wisconsin, and the movement toward service-at-cost franchises. While the underlying principle of the cost-of-service or flexible fare franchise is without any doubt economically correct in practice it has not yet, so far as I am aware, measured fully up to expectations from a credit standpoint. The goal toward which the industry must strive is regulation, practically automatic in its operation and sufficiently responsive promptly to administer adequate relief in periods of high costs and thus enable the corporation to maintain unimpaired its earning power and credit. The public must come to recognize that the utility business is essentially public business, and for their own welfare it must be accorded the earning power to enable it to function properly.

FEW RAILWAY SECURITIES NOW MARKETABLE

At the moment, there are but few electric railway companies that can fulfill the requirements of the investment market. If net earnings can be improved and stabilized, then they may look forward to an increasing ability to finance by mortgage securities. Their escrow bonds may later become marketable when interest rates fall appreciably below present levels.

Any electric railway company that can show stable earnings through the war period, as well as conservative practice in accounting for maintenance and replacements and in computing net earnings, can find a market today for an issue of well secured mortgage bonds of sufficiently high coupon rate to meet the market when not preceded by too large a proportion of prior lien securities. The interest yield requirements unfortunately are necessarily greater than a light and power corporation of similar size and setup.

Home-Town Financing

Short-Term Notes in Best Demand, Sold for Cash Across Counter or by Special Type of Salesmen—Partial Payment Not Favored—Nominal Charge Made for Resale Service.

By S. B. WAY
Vice-President the Milwaukee Electric Railway & Light Company

"HOME-TOWN FINANCING" is construed in this discussion as the local distribution of an investment security in the name of an issuing company. Such a happy means of financing is ideal. If each community were owned by its patrons, there would be universal satisfaction with service and acquiescence in rates of fare that approach the actual cost of service.

The idea is not new. Many abortive attempts at home-town financing were made in connection with the organization of street railways. In their modest beginnings street railways were the product of home-town enthusiasm and the critical attitude did not develop until some impersonal absentee stockholder was persuaded to hold the bag.

It was a foregone conclusion that outside capital would be required to finance the early street railway; the locality could only trade out its enthusiasm in its own wonderful future for some one else's ready cash and hope of profit.

This resulted in the complicated financial structure which the usual street railway passenger often views with open suspicion. Securities had to be developed to suit a variety of tastes and fit various methods of distribution. A variety of expedients had to be devised to make an engraved certificate more attractive. Bonds for long-time investors required special promises and the skilled services of investment bankers before being ultimately distributed. Bond-secured notes required the same method of placing. Preferred stocks required more speculative appeals until after becoming properly seasoned and of good repute they reached a fixed investment placing. Common stock usually failed to proceed very far on the road to distribution. Its only appeal lay in keeping intact large blocks which presumably carried with them some measure of control.

The creation of outside markets resulted in the investment banking business. The street railway industry owes it some debt for its labors, for without these the horse cars would still be with us.

It is not surprising, therefore, that the problem of financing the street railways should be considered a business separate and distinct from the problem of running the cars. It is not surprising, also, that the recurrence of the idea of home-town financing should early meet the opposition of investment bankers. It has been realized, however, from the brief experience obtained in new home-town financing that the distrust, the criticism and the disregard of the rights of investors by the local public have begun to disappear, adding safeguards more substantial than promises to the holders of securities distributed by investment bankers. This realization is evident from the approval of home financing contained in the recent report of the committee on public service securities of the Investment Bankers' Association of America:

> During the development of the utility systems the centers of finance have been appealed to for provision of the large investment funds required, and this has resulted largely in dissociating local communities and the customers of utilities from financial interest in utilities. The public served has felt little or no responsibility to absentee owners and local antagonisms to efficient utilities have often resulted. It is in the public interest that the securities of utilities be owned in large part by the communities served, so that the public need for adequate and efficient service may be supported by the self-interest of the individual owner of local securities. . . .
>
> The practice of local utility security distribution is encouraged by bankers. Making the public responsible, to the extent of the local distribution, for the fair treatment and the prosperity and success of the enterprise, it encourages thrift and affords an investment opportunity not usually open to small investors; it affords local critics of managers and operatives tending to alert regard for the interests of both the property and the public; it improves the morale of the employees by keeping them in touch with the real owners of the property, and it is in effect a form of modified public ownership under private control and operation which is probably the most efficient status of all utility enterprises.

Local placing of securities under the usual methods of distribution is difficult. Analyses of the kind and variety of security holders show that but small amounts of securities distributed in the usual way land in the hands of local investors. When so held they are found among the well to do, whose local influence upon public opinion is not appreciable. Even where local holdings are so appreciable as to provide listing on the local stock exchange the investment class is so unimportant that the prominence given invites rather than discourages "bear" movements by the politicians.

THE PLAN AS USED IN MILWAUKEE

It is not surprising, therefore, that a large number of utility properties have found it to their interest to examine the possibilities of home-town financing and to take an occasional flier in that direction. During the war, especially, traction securities "enjoyed" an unusual amount of ill repute among the clientele of the investment banker. The experience of traction companies and the publicity given to their hardships and political entanglements served to create uncertainty about their ultimate values, and the market became very limited and finally disappeared. The stringent provisions of the federal income tax tended further to destroy whatever market was left for the securities of those traction properties whose reputation had not yet been lost. In fact, practically the only investor who still has any faith in traction companies lives in the home town.

Experience has proved that with the home-town investor the value of physical property is of more interest than market value; past reputation for paying all obligations on the date due is of more significance than interest cover, margin of safety, investment rating,

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S. B. WAY *has for the past seven years been vice-president and general manager of the Milwaukee Electric Railway & Light Company. Prior thereto he had been vice-president and assistant general manager in charge of the light and power departments since 1911. Mr. Way has also been actively interested in the management of the Wisconsin Gas & Electric Company, operating in Racine and Kenosha, the Watertown (Wis.) Gas & Electric Company, the Burlington (Wis.) Electric Light & Power Company and the North Milwaukee Light & Power Company, all of which are identified with the North American Company. For nearly twenty-five years Mr. Way has been connected with the public utility business and during practically all of that time he has been associated with the interests of the North American Company. For that reason he is extremely well fitted to analyze the subject of home financing, for during the past few years the utilities under his direction have utilized on several occasions this means for obtaining new money.*

privileges, tax exemptions, special restrictions and all of the other special enticements that have grown up as integral parts of the general security investment market. The home-town investor is interested in simplicity, and the usual so-called "window dressing" is a detriment, rather than an advantage.

It is essential, therefore, before offering securities for local sale, either by franchise agreement or commission order, to have established the fair value of the traction property and the reasonable earning power in respect of such value. The patron public can then be safely invited in if the security offered for sale is safe when considered by these standards.

Some of the advantages and disadvantages of local holdings of securities are: A better local understanding of the economics of the business, which is prompted by self-interest and which carries with it better public relations. This has made unscrupulous attacks by the issue-seeking politician actually unpopular. A sufficiently wide distribution among the railway patrons should form a more logical basis of public ownership than municipal ownership. The advantages of supplementing general financing plans through local financing, thus increasing the amount of money raised, must not be lost sight of, and mention may be made of the desirability from the traction company's standpoint of any issue of securities which does not carry restrictions which may be burdensome when the company is again required to resort to its credit. The disadvantages, if there are any, arise from efforts necessary to the maintenance of a good reputation and to adequate publicity of the company's business and the restricted ability of local investors to absorb securities.

A Salient Statement by Mr. Way

A sufficiently wide distribution of its securities among the traction company's patrons should form a more logical basis of public ownership than municipal ownership. The advantage of supplementing general financing plans through local financing, thus increasing the amount of money raised, must not be lost sight of and mention may be made of the desirability from the traction company's standpoint of any issue of securities which does not carry restrictions which may be burdensome when the company is again required to resort to its credit.

SECURITIES ADAPTABLE FOR LOCAL SALE

All classes of securities are not equally adapted for home-town distribution. Only those that carry an obligation to pay interest or a preference as to dividends should be offered. Prior issues subject to wide fluctuations in market value and yield should never be offered the small local investor. Until market values and earnings are thoroughly established an issue not heretofore sold by dealers should be selected for local distribution.

For some reason long-term securities seem not to sell well locally. Five-year maturities appear to have the strongest appeal, although a substantial percentage of preferred stock and ten-year maturities has been sold in connection with five-year maturities in certain instances. This makes it desirable, where notes are offered, to include a provision for conversion into preferred stock or bonds of longer maturity. It is also important to provide a wide selection of denominations in the issue of notes or bonds. Denominations of $50, $100, $500 and $1,000 have proved practical. If preferred stock is sold it is more important to pay dividends in cash than to include a cumulative feature.

Experience indicates that five and ten-year notes together sell in about twice the volume of preferred stock. In the local sale of one issue of over $3,000,000 of five-year notes, 1,737 were of $50 denomination, 1,592 of $100, 1,493 of $500 and 1,663 of $1,000. These notes were sold to 4,064 individuals, of whom 1,394 were women, the average sales being $659 per buyer. A recent issue of $500,000 of preferred stock sales was made to 753 individuals, of whom 195 were women, the average sales per buyer being $664.

Methods of effecting sale of home-town securities must be determined by local conditions. There is an important advantage in literally selling securities "across the counter" at the company's offices. All printed advertisements and circulars should prominently feature the company's name and be signed by it. Salesmen handling prospects need not have had previous security sales experience. It is more important that they understand how to deal with the public courteously and efficiently. As most of the local buyers are not accustomed to purchasing securities they are not familiar with the technical terms of the investment banking house. Hence on the salesman's part familiarity with the company, the article it sells, and the business it does are most important, and ready and truthful answers to simple questions are of more value than long-winded expositions. Familiarity with every reference to the local company in the community papers and intelligent discussion thereof are also essential. It is important from the start to fix in the minds of timid, first-time buyers that the sale of its own securities is a permanent part of the company's activities and that those facilities will be constantly at the service of its customers.

Experience discloses that a very large proportion of actual sales is uncovered by newspaper advertising. Such advertising should tell the story of the company in simple language, avoiding technical financial terms, and departing radically from the typography and conventional style of the usual financial advertisements. Why the securities are being sold, what the proceeds are to be used for, governmental authority and safeguards under which issued and terms of payment are points which must be covered in the advertisements. If the company is under state or local regulation the fact that an implied regulated minimum return assures stability and eliminates speculative hazards is an important selling point. Thrift talk is always helpful. Inquiries through personal call or mail should be followed up as promptly, persistently, carefully and tactfully as complaints in a well-organized complaint department. The effort should be jointly one of improving public relations and selling securities, and all salesmen should be able to close the transaction, deliver securities and receive payment. The small investor expects the company to have sufficient confidence in its agent, who answers questions about the company's affairs, to entrust him with the securities he sells, particularly as the customer is expected to trust the same agent with his money.

To the individual unaccustomed to dealing in securities, an offer to sell below par suggests a bargain sale of damaged or shopworn goods. Such investors think of their return only in terms of the stipulated dividend or coupon rate. Sales at par carry the presumption that the securities are worth their face amount and avoid the suggestion of possible further depreciation in value when the customer may wish to sell. All adjustment for accrued interest and dividends should be simple, as inexperienced buyers of securities find it difficult to understand such adjustments. One simple solution is to omit the interest period and amount on the first coupon and fill in this information properly on the date of purchase. Partial-payment plans, with their complications, should be avoided. The customer should be urged to purchase only the amount of securities for which he has cash available. Coupons should be cashed at the same counter at which sales are made. This gives further opportunity for sales effort.

The maintenance of the market for securities sold only by the company is of great importance. Confidence in the value of the securities is best developed by a continuous market at least equal to the original purchase price. Except in cases where holders have real need for cash invested in securities the ability to sell readily at cost dispels the desire to sell. It is not necessary or desirable to resell securities for customers without charge. A nominal charge of, say, one point, while imposing no burden on the customer, at the same time operates to act as a deterrent against unnecessary and ill-considered selling.

Maintenance of the market power does not mean that the company buys back its own securities. Since the proceeds thereof have been invested in permanent improvements it is impossible for it to do so, and there is no difficulty in making it understood that its security sales department merely places its distributing facilities at the disposal of the customer, taking the securities on consignment for resale. Experience indicates that the amount of securities so handled has been very small, even during recent periods of very high yields in the general investment market.

With sales of such small transactions as have been under discussion a large proportion of the purchasers are investors of the savings bank type, accustomed to savings bank interest, safeguards and conveniences. Such persons are slow to sell. When they are compelled to liquidate their savings they have definite and legitimate reasons and must be protected from note shavers and speculators by having a stabilized market and a means of reaching it at a nominal cost. The favorable experience of such people brings more buyers among their friends and establishes a very favorable proprietary local interest in the company.

The idea of home-town financing is not novel or in its experimental stage, but it is a reversion to the type of financing attempted at the beginning of the traction industry. It carries with it all the obvious advantages flowing from a proprietary interest on the part of patrons. When approached from the first simple and rudimentary principles of finance it is not a difficult method of distributing securities or beyond the successful organizing abilities of public utility operators. Its contribution to the financial requirements of the traction industry cannot be expected to be sufficient to solve the problem of financing and refinancing. But it can be made a substantial help. It carries with it, perhaps more than any other method, improved public relations.

Financing a Public Utility by Sale of Stock

For Sound Financing Not More Than One-Half of Net Earnings Needed for Interest Payments—Sale of Stock Urged for Extensions and Betterments—Investment Banker Has Not Lost Faith

By CHESTER COREY
Vice-President Harris Trust & Savings Bank, Chicago, Ill.

IT MAY seem absurd to talk about selling the stock of street railway companies when there is no general market for even their first mortgage bonds. It is well to remember, however, that history often repeats itself and that the market price of the stock of a company may advance within a comparatively few years from a nominal figure to a sufficiently high price so that the company can raise money by issuing and selling additional stock. For instance, in 1896 the common stock of the newly reorganized Atchison, Topeka & Santa Fé Railway sold as low as 8¼ and the preferred stock as low as 14⅛; in 1901 the common stock sold as high as 91 and the preferred stock as high as 108, though it should be borne in mind that the reorganization was made on a sound basis and that the management of the property was of the very best.

A public utility company within the last ten years found its cash resources so depleted that common stock dividends had to be discontinued, and an emergency loan became necessary to save a default in the payment of bond interest. Within less than two years of that time that same company sold to its customers several million dollars of a newly created preferred stock, all because a conservative financial policy was adopted and adequate depreciation reserves were set up out of earnings.

SAFE PERCENTAGE OF NET FOR INTEREST

The great mistake of corporate financing has been the creation of funded debts to an amount unduly large in proportion to the amount of the total investment. The experiences of the last three years have shown that a company cannot pay out 75 per cent of its net earnings as interest charges and maintain its credit. If a company pays out 35 or 40 per cent of its net earnings in interest and has a substantial amount remaining after providing for depreciation and other reserves and the payment of dividends, that company has credit and can raise money by selling additional stock as soon as the investing public is convinced that the favorable showing is permanent and not temporary. However, all of the mistakes of the past should not be charged to the companies or the rate regulating bodies. The banker has oftentimes shown poor judgment in failing to distinguish between sound and unsound financial structures.

The unfortunate financial position of the street rail-

CHESTER COREY, *vice-president Harris Trust & Savings Bank, Chicago, has been actively associated with the financing of public utility properties for some twenty years. It was in Boston in 1894 that he first became connected with N. W. Harris. In 1907 he transferred his headquarters to Chicago. During this long period of service Mr. Corey has been prominently associated with the financing of public utilities in practically every large city in the country. He is a firm believer in the idea that the total capitalization of a utility should not be in excess of the fair value of the property and that the funded debt should be but a subordinate part of the total.*

ways arose primarily out of the slowness of the public, acting through the rate regulating bodies, to realize that street railway operating costs had increased by leaps and bounds and had in many cases absorbed all of the 5-cent fare and more. Bonded debts in many of these cases were too heavy to allow for much if any shrinkage in earnings without immediate trouble; or, in other words, many companies had failed during times of prosperity to provide proper equities by selling their capital stock. There were too many creditors and too few partners.

THE FOUNDATION OF RECONSTRUCTION IS A REASONABLE FARE

The credit reconstruction problem of the street railways is not an easy one, but the foundations are sufficient fare to yield generous returns on investments and a funded debt which will require the payment of interest charges amounting to not more than one-half and preferably not more than one-third of net corporate earnings.

As a part of the reconstruction program the sale of stocks must ultimately play an important part, and each company should raise substantial amounts of money for any extensions and additions, including new equipment, by selling its stock, preferably in the community which it serves.

During the recent troublesome times some companies have sold stock to customers and employees; in fact, this method of financing has saved the day for many of the public utilities, and not only has the necessary money been raised but local communities have become interested in the financial welfare of "their company."

ELECTRIC RAILWAY MUST COMPETE FOR MONEY IN THE OPEN MARKET

Inasmuch as the rates of fare, service, accounting and the issuance of securities are supervised in almost all communities, there is little danger that unduly large dividends can or will be paid. Generous dividends, however, must be paid and comfortable surpluses must be earned if the public utilities are to function properly in the forward progress of the country.

The public is learning that capital is not attracted unless generous returns are assured. Rates of return are too high on the best securities, such as government and municipal bonds, to make old rates of interest attractive. If the public utilities are to obtain the money necessary for them to give the service the public demands, they must be allowed earnings sufficient to compete in a market for money when the demand exceeds the supply.

The investment banker has not lost his faith in the electric railways and will be willing to buy mortgage bonds of these corporations as soon as the rate regulating bodies are able to convince the investing public that public sentiment is well established in favor of determining the value of the electric railways and allowing them to earn substantial returns upon their investments after providing for operating expenses, maintenance, taxes, interest and full depreciation. It will be up to the companies themselves, however, to provide and maintain substantial equities in their properties over and above the amount of bonds outstanding and to make their principal effort to raise money by the sale of stock rather than to try to borrow the last available dollar by the issue and sale of bonds.

Municipal Aid in Railway Financing

Local Transportation Systems Essential to Community Life—Service-at-Cost Franchises Recommended—Municipal Credit Might Be Offered for Extensions—State Commissions Should Have Power to Regulate Fares

By MELVIN A. TRAYLOR
President First Trust & Savings Bank, Chicago

THE development of our local transportation systems has been both a cause and an effect of the spreading out of our municipalities. The extension of municipal boundaries would not have been possible without the development of the electric lines. On the other hand, the lines would never have developed to the present extent were it not for the fact that in this country people are not accustomed to live within walking distance of their place of business. In continental Europe the business man often lives above his business and the laborer next door to the factory in which he works. Such a development, however, has certain unfortunate social results. In Chicago and New York this would mean more tenement houses in which the people would be herded together like cattle. This in turn would mean a development of all that social unrest which a few decades ago we called "anarchy" and now call "bolshevism."

COMMISSION REGULATION AN AID TO RAILWAYS

At present little is being done for the further improvement and development of local transportation facilities; in fact, the very maintenance of existing systems is being called into question. The immediate cause is that the cost of everything has increased largely, and the companies which had great difficulty in getting along on the 5-cent fare are now finding it utterly impossible to do so. Had it not been for the advent of state commissions with power to regulate rates of fare the electric railway industry would have become hopelessly bankrupt. In general there has been a total lack of municipal aid at the right time and in the right way. It has been claimed that the "greedy corporations" were violating their contracts by increasing fares and that their property ought to be taken over by the city so that the original agreement might be carried out. People of intelligence knew very well that in such an event the deficit would have to be made good by increased taxation, but as taxes are paid by the few and not the many, and politicians are interested in the many and not the few (since each of the many has a vote) the facts in the case made little difference. So, when a street railway franchise expires or its termination can be foreseen, the fact seems to be contemplated with a grim satisfaction by

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MELVIN A. TRAYLOR, since Jan. 1, 1919, president First Trust & Savings Bank, Chicago, began his banking experience as cashier at the Bank of Malone, Tex. Two years later he was appointed cashier and then vice-president of the Citizens' National Bank, Ballinger, Tex. Upon consolidation of this bank with the First National Bank he was elected president of the combined institution. In 1911 he became vice-president of the National Stock Yards National Bank, East St. Louis, and in 1914 went to Chicago as vice-president of the Live Stock Exchange Bank, later succeeding to its presidency, which position he left to enter upon his present duties. Mr. Traylor has some very definite ideas about the future of electric railway financing, the kind of ideas that somehow should be got home to the public. He is keenly aware of the difficulty of the situation in Illinois, where politics seems to be running rampant with the public utilities as the principal sufferers.

all politicians, and the opportunity is immediately embraced to create a political issue, of which there is at all times great dearth.

RECOMMENDATIONS FOR REMEDIES

How shall we remedy this situation? Probably the best way is to follow the recommendations made in the report recently issued by the Chamber of Commerce of the United States of America. The plan is based upon the following propositions:

(a) That users of the service should pay only the actual cost of providing such service.

(b) That cost of service includes all outlays for operation and maintenance, provision for renewals and replacements, taxes and fair compensation for the capital actually and necessarily used in the service of the public based upon an agreed valuation of the property, irrespective of stocks and bonds outstanding.

(c) That the revenues from fares should at all times be sufficient to pay all costs necessary to the supplying of efficient service, of the extent and standard designed by public authority.

(d) That the rate of fare should automatically increase or decrease to correspond with any substantial increase or decrease in costs.

(e) That the city may, if it should so determine in the future, acquire the property on an agreed basis of actual values.

This plan contemplates that ultimate direction of the extent and character of the service to be given and the facilities to be provided shall reside in a city official or board. The company is bound to provide such facilities and service as the public through its official agent requires, and the public, on the other hand, is bound to provide from the fares paid the means to meet the outlays thus imposed.

Under such a plan the rate of fare would automatically increase or decrease to correspond with any substantial increase or decrease in costs, for the public desires and is entitled to the best service and ought to be willing to allow the company, or, for that matter, a municipally owned street railway system, to charge a just compensation for the service rendered. If this is done it will develop new districts where the laboring classes can live under proper conditions.

It is the civic duty of the municipality to bring about the changes suggested, and the increase in taxable real and personal property values will afford an economic justification for a loan of municipal credit when needed to finance costs of extensions of local transportation systems. It is now generally recognized that without direct municipal aid it is almost impossible to plan extensions or to establish rapid transit lines such as elevated or sub-surface structures.

GUARANTEED RETURN ON INVESTMENTS ADVOCATED

Another more direct and substantial aid is that of a guaranteed return on invested capital. A proposed plan of this character differs from the aid designed by the federal government for interstate railways in that the proponents of the plan claim that the return on capital invested in local transportation systems should be paid by the municipality whether earned by the system or not. It is pointed out by the champions of this scheme that Massachusetts has adopted some laws which provide for aid of this character for local transportation lines, and that Wisconsin also, through the so-called Kenosha enabling act, has expressed willingness to extend aid which will accomplish similar results. Personally, it is difficult for me to imagine a state of affairs which would justify aid of this particular type. It seems to me to have most of the dangers of public ownership without any of the corresponding advantages, if such there be.

In my opinion, the best plan evolved so far is the service-at-cost franchise. Inherent in it, unfortunately, is the danger that there is not sufficient incentive to economy and to increased efficiency, since, irrespective of what conditions prevail, the public pays. Possibly some scheme like that used in the case of the Massachusetts gas companies may be developed, where, as the efficiency increases and the cost to the public becomes less, the corporation is permitted a larger percentage of earnings. Possibly the one element lacking under this plan would be the difficulty managements might encounter in the regulation of wages of employees. For this reason, is it not possible that there could be arranged some profit-sharing scheme by which the employees of the company would first of all be assured of a living wage, fluctuating with the cost of living, and then participate in the profits of the company in proportion as they assist in the reduction of the expenses of the service? Under such an arrangement we should probably find that the employees would become increasingly efficient and seek to obtain the greatest possible results with the smallest amount of power, at the same time attracting patronage to the lines by virtue of their politeness and courtesy.

Unfortunately, at present, there are still existing many causes which seem to make necessary public guarantee of returns on capital invested in public utilities. These reasons are:

1. Lack of stable returns.
2. Hazards of the business.
3. Capital does not flow freely into this business.
4. Needed improvements cannot be made.
5. City transportation systems may soon retard municipal and industrial growth.

MUNICIPAL OWNERSHIP

I have merely touched upon one aspect of the matter, namely, the need of a different attitude on the part of the public toward public transportation companies and the necessity for a change in the relationship between city governments and privately owned local transportation companies. There are many who prefer to have all public utilities owned by the cities themselves and there is no doubt that unless something decided is done soon this will be the result all over the country.

As to the undesirability of municipally owned public utilities, for the best arguments I refer again to the report of the Chamber of Commerce. Municipal ownership, wherever tried out, has proved uneconomical and unsatisfactory. Political considerations are almost bound to creep into questions of management, and inefficient people are kept on the payrolls because they control votes.

As far as the private investors are concerned municipal ownership is perhaps the best thing under present conditions that could happen to them. The United States Constitution forbids confiscation, and the cities, in taking over the transportation systems, would have to pay an adequate remuneration to the present holders of the stocks and bonds of such enterprises. This would probably be the easiest way out for them, but I wish to emphasize once more the necessity for all of us to take a broader view of the question, since the whole future development of our cities depends upon the proper treatment of the question, of which I have sought to state some of the principal aspects.

Public Opinion and Utility Problems*

The Public Utility Has Its Salvation in Its Own Hands—Adequate Service Must Be Furnished by the Electric Railways to Offset Adverse Public Opinion — When Accomplished, Commission Regulation Will Prevent Confiscation

By Hon. JAMES H. WILKERSON
Former Chairman Illinois Public Utilities Commission

Hon. James H. Wilkerson

THE problem of the public utilities, like every other business and economic problem of today, springs from the war. It has many difficult elements resulting from the nature of the business and the close relation which the service furnished bears to the daily life of the people. The frequency with which the people come in contact with these public utilities and the circumstances under which they come in contact with them give rise to perplexing factors in the problem, with the psychological scenery all set for the entrance of the demagogue.

My own view necessarily is that of an outsider, one whose duty it has been to endeavor to apply impartially the rules prescribed by law. An administrative board charged with the enforcement of laws does not possess arbitrary power. It should not act from whim or caprice or consider political expediency. It is subject to constitutional limitations and to statutes which created it. Whatever opinions its members may have individually, the board as such has no concern with the wisdom of the law under which it operates. Its duty is to enforce the law as it finds it, and, for the result, it is answerable to the courts only.

Experience has led me to the conclusion that the permanent and final solution of this problem involves something more than statutes, court decisions, orders of commissions, or ordinances of city councils. Constitutions and laws and decisions have no permanency unless back of them is the sentiment of the people. No question whose solution involves the enactment, interpretation and enforcement of laws can ever be finally settled until it is settled in the minds of the people and until the law reflects the true thought of the people.

SALVATION OF RAILWAYS IN THEIR OWN HANDS

I am satisfied that your fate is in your own hands, and that you must work out your own salvation by bringing your case home to the people. You must get back of you not merely laws, which may be amended or repealed, or orders, which may be modified or set aside, or court decisions, which give you nothing but bare legal rights, but also a public support and confidence which will restore your credit and insure a permanent and stable settlement of your difficulties.

If you fail in the task just ahead of you, of crystallizing a solid and permanent popular support for private ownership under state regulation, there can be no doubt that the next step will be the experiment of public ownership—an ownership which was recently averted in the case of the steam railroads by one of the most thorough campaigns of education ever carried on in this country.

Let us analyze briefly the problem. Here is a transportation enterprise with an invested capital of nearly five billion dollars. The steam railroads have been called the arteries of the nation's commerce. The electric railroads are just as close to the life of the great cities and industrial districts. The whole growth of the great cities is centered around them. They have given such an impetus to city development that it has been impossible for the transportation systems to keep pace with the growth of the cities.

Notwithstanding the development of other means of transportation, the use of the electric railways has been continually increasing. In New York City the average annual number of rides per capita is now 370 and in Illinois it is 114. This shows how intimate is the contact of this service with the daily life of the people.

The early period of electric railway history was like that of the steam railroads. There were overcapitalizations, corporate mismanagement, failure to provide for depreciation, payment of unearned dividends, overbuilding into unprofitable territory and stock manipulation for purposes of promotion and speculation.

In the case of urban lines, the right to occupy streets was under either limited or indeterminate franchises which contained provisions as to compensation to be paid for the use of the streets, as to sprinkling, paving and other requirements. Most of the franchises also provided for a uniform 5-cent fare. It seemed to be taken for granted that nothing would ever happen in this country which would make the 5-cent fare insufficient to take care of operation, provide a fair return and maintain the enterprise on a stable and prosperous basis.

With the electric railways, even before the war it was apparent that there must be a process of reorganization and readjustment. In fact, some of the electric railways had already gone through that process.

The history of our steam and electric railroads is in no respect different from that of every new enterprise in the history of the world. With every new invention the imagination is always at work capitalizing dreams which never come true. The evils attending the promotion and organization of new enterprises are all adjusted in the end. Overcapitalization and speculation in the beginning should not be a bar to fair treatment by the public when the enterprise has been once put on a solid basis.

Several years before the war, many states established supervision of service, and the police power was exercised to require reasonable fares. The purpose of these laws was to take the public utility question out of local politics and to prescribe a fixed rule by which values and returns should be determined, subject to final review by the courts.

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*Abstract of address at the annual dinner of the American Electric Railway Association, Chicago, Ill., Feb. 10, 1921.

When commission regulation was established, complaints were made in some cases that the fares fixed in the franchise ordinances were too high. In a few states there were constitutional or statutory provisions giving to cities the power to make such contracts for fares. In most of the states, however, the authority to make contracts for fares binding against the exercise of the regulatory power of the state was not conferred upon cities. It was soon established by decisions of the Supreme Court of the United States that, generally speaking, these 5-cent fare provisions could not be enforced by the companies if the state, in the proper exercise of its authority to fix just and reasonable rates, prescribed a lower rate of fare. These decisions were viewed with considerable alarm by those engaged in the street railway business, because they meant that the capitalization upon which a return could be allowed must be made to correspond with actual values.

In most cases, however, the commission did not attempt to change the fares which had been fixed in the ordinances. Then came the war.

NO IMMEDIATE RELIEF FROM WAR COSTS

The War Labor Board ordered increases in wages, and materials and supplies had to be purchased at prices fixed by the government. The government had taken control of the steam railroads and had advanced rates to cover increased operating costs. In dealing with the electric railways, the war power was exercised to increase operating costs, but the railways were left to the local authorities for an adjustment of fares to meet their increased necessities. To be sure, the War Labor Board gently suggested to the local authorities that it would be highly proper and very patriotic for them to give consideration to what the government had done under the war power with reference to wages, and to grant relief to the railways which would make provision for their increased necessities. These acts will always stand out as one of the great injustices of the war period. Certainly it would have been just as proper for the government to exercise its war power to give to the electric railways adequate rates of fare as it was to exercise that power in fixing the wages of their employees. The electric railways were just as necessary to the successful conduct of the war as were the steam railroads, the telephone and telegraph lines, the shipyards, and other industries over which the government took control. Without the electric railways, the work in the great centers of industry could not have been carried on.

The processes through which relief could be obtained from the local authorities were slow and uncertain. In states having no commission, or in which the jurisdiction of the commission was so limited that it could not grant relief there was confusion confounded. In Ohio, the cases of Columbus and Toledo are striking examples. In New York, the Court of Appeals held that the Legislature had not given to the Public Service Commission power to fix rates in cases where there was a contract between the city and the company for a rate. In New York City, as in Chicago, the worst elements of the press united with the worst elements in politics in a campaign of gross misrepresentation and in an attempt to make political capital out of an emergency resulting from war conditions.

STATE COMMISSIONS ASSAILED AS ENFORCING LAW

In states having commissions with authority to act, the appeals for relief were made to those bodies. The situation in Illinois is illustrative. These appeals were in many cases bitterly contested by the municipal authorities. It was urged that notwithstanding the action of the federal authorities as to wages, and the great increase in operating expenses due to the general advance in prices of commodities, the applications of the street railways for relief should be denied because of the provisions in the franchises fixing fares.

This attitude toward advances in street car fares is one of the strangest and most incomprehensible things which happened during the war. The 5-cent fare had become impossible due to the increases in wages and the prices of all commodities. Yet it was contended that the street car companies must continue to operate on a 5-cent fare, when that rate of fare would not produce enough to pay actual operating expenses, to say nothing whatever of any return upon the capital invested in the property.

Not only that, but in Illinois this contract question had been definitely settled long before the public utilities law was passed. The question had been before the Supreme Court of the State in three cases and had gone to the Supreme Court of the United States. It was settled in Illinois at the time the public utilities law went into effect that statutes such as those under which the city exercised authority over the local transportation systems did not confer upon the city power to make a contract for a rate valid against the exercise of the police power of the State, and it made no difference whether the subsequent exercise of the rate fixing power was by the Legislature itself or by the city under its delegated power to fix rates.

Shortly after the public utilities law went into effect, the question was raised with reference to service provisions in the Chicago ordinances. Our Supreme Court held that these were matters as to which the city was without authority to contract away the police power of the State, and that ruling was upheld by the Supreme Court of the United States. In other cases, involving contracts between street railway companies and cities for rates of fare, the Supreme Court reaffirmed the rule which had been laid down in the cases decided before the passage of the public utilities law.

It is settled, as definitely as any question was ever settled in the courts, that these contract provisions were inserted in the ordinances without authority of law, and that when the public utilities law became effective all rates were subject to the rule that they must be just and reasonable.

The commission had no discretion in the matter. It was its duty to comply with the requirement of the statute and to determine what rates were just and reasonable. Yet, notwithstanding the clear necessity for prompt relief, in spite of the definite rulings of the Supreme Court there were assaults in many cases upon the commission for enforcing the law, and the companies were denounced as contract breakers.

TEMPORARY RATE BASES ESTABLISHED

Another question confronting the commissions was that of the granting emergency relief without complete valuations for rate-making purposes. In most states it was held that the commissions did have this authority. A ruling to the contrary would have meant ruin to these utilities. Valuation proceedings are long and tedious affairs. In granting emergency relief, the rule was followed that a rate would be fixed which was sufficient to take care of operating expenses and depreciation and in addition to give a return upon the lowest valuation which it was reasonably possible to place upon the property.

Some measure of relief was thus afforded through temporary orders. The commissions, having granted temporary relief, proceeded to determine the valuations for rate-fixing purposes. The principles to be followed in making these valuations, generally speaking, thus far have not been very definitely established. The point of uncertainty is the extent of the consideration which is to be given to war prices. The valuations which have been made by the Illinois Commission follow the decision of our Supreme Court in the Springfield gas case.

This, briefly, is what the commissions did in granting relief to the electric railways. What would have been the result if the commissions had yielded to the clamor of agitators and had failed to act in this emergency? The utilities would have had the right to resort to the federal courts for protection of their property against confiscation. And, in giving this protection, the federal courts would have fixed the rates to be charged. There would have been a complete abdication of their authority by the states.

COMMISSIONS MAKE CORRECT DIAGNOSIS

The commissions have been absolutely right in what they have done in granting this relief. I make this prediction with reference to the cases in Illinois, particularly in Chicago. These cases are now in the courts. If the representatives of the city, who have taken these appeals have the courage to follow them up, the orders of the commission will be sustained. If the commission in this state, in the face of the constitution and the statutes, undertakes to impose upon these utilities confiscatory rates, their orders will be stopped in the federal court.

These assaults upon the commission are in their last analysis assaults on the constitution and the courts, because the commission, in making its decisions, has followed the constitution and the rules which have been prescribed by the courts.

It would not have been believed five years ago that such an attack upon constitutional rights would have been tolerated in the State of Illinois. Of one thing we may be sure. This is not Russia. This is not Germany. This is the United States of America, and the courts and the army of the nation will stand, if the necessity arises, against confiscation of property.

There is one incident in the history of this State. This State once abdicated the functions of government and refused to enforce the law and to protect property rights. President Cleveland put the entire force of the nation behind the orders of the federal court. I do not believe that this will be done again in Illinois, but, if any agency of the State fails in the performance of its duty to protect the rights of our citizens, you may rest assured that the federal courts and the federal government will not fail to act.

The relief which the commissions granted was, generally speaking, inadequate. This was necessarily so because of the rule required to be followed in granting emergency relief, and, as I have pointed out, final valuations could not have been made without hearings which would have taken a great deal of time.

On Dec. 31, 1920, there were, in the United States, in the hands of receivers ninety-one companies with 5,330 miles of track, representing about 11 per cent of the total street railway mileage of the United States. This was in addition to the lines foreclosed, reorganized or wholly abandoned.

The average advances which have been allowed by local authorities to the electric railways have not been as great as those which the steam railroads have received through the more efficient agency of the federal government.

HOW THE SITUATION STANDS

Let us take an inventory of the situation. From a strictly legal standpoint, it is satisfactory in most of the states. The commissions are acting under laws which entitle the utilities to just and reasonable rates. Commissions must follow this rule and must recognize constitutional rights. Even if the public utilities laws are repealed, the old contract ordinances will not be revived. They went down when the public utilities laws went into effect. They were superseded by the general rule which the legislatures prescribed for the fixing of rates. If the rate-making power is returned to the municipalities, their ordinances will be subject to constitutional requirements, and if those ordinances are confiscatory, relief will be afforded in the federal courts, just the same as against confiscatory orders of commissions.

The principles which are required to be followed in making valuations are becoming settled. While there is still some uncertainty, doubts are gradually being removed. Courts almost without exception are laying down the rule that commissions, in making their valuations, must give substantial consideration to present-day prices. This insures valuations which will make possible the financing required for needed improvements and extensions.

As to the rate of return, the state and federal courts are recognizing that it requires a higher rate to stand the test against confiscation than it did before the war. But it is not sufficient merely to save the properties from confiscation. It is not sufficient even to get a permanent valuation based upon sound principles and a rate of return required by present economic and financial conditions. If these utilities are to continue to function, they must provide service, and to furnish service, they must have improvements and extensions. This requires money, and money requires credit. Credit cannot be obtained if it is necessary to be continually running to the federal court to save the property from being confiscated. Credit cannot be obtained if public utility commissions are appointed to deliver decisions which have been promised in a political campaign. In fact, the credit of these utilities will never be established until this subject is taken out of politics, until commissions are permitted to function like courts. And this will not be accomplished until there is an enlightened public opinion based upon an appreciation of the facts which will compel agitators and politicians to let this subject alone.

I know that in some sections of the country and in some communities there is a realization on the part of the people of the importance of this subject, and of the principles which should be applied in dealing with it. But, in general, the situation is a great deal like the free silver agitation prior to 1896, or the steam railroad problem before the campaign of education by which the people were made to realize the necessities of the railroads.

What is the reason for this agitation? Whatever it is, the situation is in your hands. You must counteract it by doing everything within your power to render satisfactory service. I know the circle around which you are traveling. There is poor service because there is no money, and there is no money because there is no credit, and there is no credit because of the antagonism of the people, and the antagonism of the people results from poor service.

RENDER THE BEST SERVICE POSSIBLE

The only way you can break through this circle is to convince the public that you are doing everything within your power to render the best service possible under existing conditions. And if you do make an honest effort, and are let alone by the politicians and the newspapers, you can accomplish this.

The chief causes, however, of this unfair agitation are dishonest politics and the dishonest press. In politics we shall always have those who are willing to capitalize every issue or any element. We have those in this country who have catered to disloyalty and treason. And to make capital out of the utility question is for some politicians a very trifling affair and one which in no way shocks the conscience.

The dishonest press is another thing. No one in this country questions the basic right of the freedom of speech and of the press. A newspaper has a perfect right to advocate any cause which it may think is right. It may advocate public ownership. It may support socialism. But it is false to the principles of true journalism, and betrays the confidence of the public, when it publishes what it knows is not the truth.

Take the case right here in Chicago. In spite of the established law and decisions of the highest courts of the state and of the nation, day after day the street car companies have been denounced as contract breakers, and the commission has been assailed as being party to the destruction of sacred contract rights. And yet, in all this denunciation, there has not been a correct statement of what the law really is or what the courts have actually held.

Another favorite falsehood is that exorbitant returns are being permitted on watered stock. The truth is that in fixing the temporary rates which were allowed during the war period, the very lowest valuation which could be placed upon the property was taken as the rate base. The truth is that the advances which were allowed to the street car companies have been much less proportionally than the advances which were allowed in railroad rates by the federal government.

It is all right to carry on a campaign for municipal ownership, but to work up a popular clamor by a false appeal under disturbed conditions following the war is intolerable.

TELL THE PEOPLE THE FACTS

This can be met only by a campaign of education. And you must realize that you are all interested in the general problem. Even if your own communities are all right, your credit depends upon the general credit of this class of utilities. It is a case of all for one and one for all. You must make the financial world understand that this is a matter of much importance to the financial stability of the country.

You must organize and you must fight. I know that some good work has been done, but I know that you will pardon me when I say that my observation has been that it has not been carried on with the zeal that the righteousness of the cause requires.

It is a cause which requires aggressive work and vigorous speech. There is a need for straightforward and emphatic expression. There is nothing to apologize about. It is better to say nothing than to make half-hearted and evasive and apologetic appeals. This is no place for the man who is afraid that he will hurt somebody's feelings. You must reach the people.

If the utilities of this country do not unite to make this kind of a campaign, if the solid business interests do not get back of you in this kind of a campaign, one for all and all for one, you will fail to establish your credit, and if you fail to establish your credit, it will mean financial panic, general pandemonium and ultimately public ownership.

Make no mistake. The courts cannot save you. They can keep the agitators from tearing up your tracks and from confiscating your property, but they cannot give you credit. Commissions cannot save you. An order is of little value which does not have permanency. Permanency requires a public sentiment which will insure the right kind of a commission and which will let the commission know that it has the support of the people in what it is doing. If you get the people back of you, if you can convince them that you have been right and are right, and that the commissions have been right and are right, they will take care of the politicians and the dishonest newspapers.

THE PEOPLE WILL BE REASONABLE WHEN THEY KNOW THE FACTS

You may say that this will be a hard task, but it is made the easier, because the American people on questions involving protection of property and financial integrity are fundamentally right. The reign of the demagogue in America has always been short. We had our great critical period when the agitators were railing against the centralized national government with the power to protect property. It was followed by the constitution. After the Supreme Court had been established and John Marshall was writing his great opinions which made this a real nation, the agitators clamored for a time for the abolition of the court, but the court and the nation still exist. In the great battle for sound money America served notice to the world that repudiation and confiscation are not in her vocabulary. And in dealing with this great utility problem you will find that the people will be sound and honest when they know the facts. There will be no destruction of property right. There will be no confiscation. The courts will do their duty and the commissions will do theirs.

I have faith in human nature, and I do not believe that in the United States there will be found a commission whose members, having taken the oath of office to support the constitution of the state and of the nation, will deliberately and willfully set about to destroy rights protected by the constitution.

The great industrial and economic structure of America, of which you are a part, is sound. The rain may descend and the floods may come and beat upon it, but it will stand, for it is founded on a rock.

Association Holds Midyear Meeting

Many Plans of Electric Railway Finance Discussed in Specially Prepared Papers—Favorable Action Taken on Report of the Federal Electric Railways Commission and the Referendum of the Chamber of Commerce of the United States

THE tenth annual midyear meeting and dinner of the American Electric Railway Association was held at the Drake Hotel, Chicago, Ill., on Feb. 10. It was preceded by a meeting of the executive committee, held at 9:30 a.m. on the same day. Condensed minutes of this meeting are given elsewhere in the present issue. President P. H. Gadsen presided at all sessions of the conference, as well as at the banquet. More than 400 delegates registered for the conference and between seven and eight hundred attended the dinner.

PHILIP H. GADSDEN

Morning Session

The meeting was called to order at 10:30 o'clock by President Gadsden. He was presented with an "Emblem of Authority," which was the handiwork of his shop employees at Charleston. He used this emblem, a gavel, throughout the meeting.

The report of the committee on constitution and by-laws was presented by Charles L. Henry, in the absence of Chairman L. S. Storrs. The report recommended that the by-laws be amended to agree with the suggestion made by J. H. Pardee in his presidential address at the 1920 convention, namely, that the executive committee be enlarged by the addition of six members elected at large, each to serve for a term of one year and to be ineligible for re-election for one year from the date of expiration of his term of office. The proposed changes in the by-laws were submitted to the membership in advance of the Chicago meeting in accordance with the provisions of the constitution. Amendments to the two paragraphs of the by-laws affected by these changes were adopted. The paragraphs as amended read as follows:

> VI. (a) The entire charge and management of the affairs of the association shall be vested in an executive committee, which committee shall consist of the president, vice-presidents, presidents of affiliated associations, five others who shall be connected with member companies engaged in the business of manufacturing or selling materials for electric railways and six members at large. The past-presidents of the American Electric Railway Association and its predecessors, the American Street and Interurban Railway Association and the American Street Railway Association, shall be honorary members of the executive committee, but without the power to vote.
>
> (b) The five members of the executive committee representing manufacturer member companies and the six members at large shall be elected to serve for a term of one year and shall not be eligible for re-election for a period of one year from the date of the expiration of their respective terms of office. All such elections shall be made by ballot and a majority of the votes of the company members present shall be necessary to an election.

The symposium of papers on electric railway finance was then taken up. Abstracts of these are grouped together as the leading feature of this issue of this paper. An introduction by J. D. Mortimer was read by title.

The first formal paper on the program was on "Previous Methods of Electric Railway Finance," by James F. Fogarty, secretary the North American Company, New York. In the absence of Mr. Fogarty the paper was read by Harold V. Bozell, ELECTRIC RAILWAY JOURNAL. This and the other finance papers are abstracted elsewhere in this issue.

The subject of present requirements for mortgage securities was discussed by F. K. Shrader, of the firm of Halsey, Stuart & Company, Chicago.

S. B. Way, vice-president and general manager of the Milwaukee Electric Railway & Light Company, then presented a paper on home-town financing.

MR. COREY ELABORATES HIS PAPER

The next paper was on the necessity of financing by sale of capital shares, by Chester Corey, vice-president Harris Trust & Savings Bank, Chicago. In addition to the remarks abstracted under the symposium, he said that while prophecies were unsafe it was not improbable that in less than five years the well-established street railways would find a good market for their stocks and bonds.

Mr. Corey also discussed briefly the question of valuation in relation to rates, and said that there were many defenders of the idea that the rates established in 1921 should be based upon current price valuations and that past averages need not be considered. Personally he did not agree with this idea unless adjustments in valuation were made from time to time as current prices varied. The rate of return would also naturally change at intervals depending on the cost of money resulting from the obligations of foreign governments and municipalities being floated here on an 8 per cent basis. For this reason home securities could only be issued at comparable rates.

Melvin A. Traylor, president First Trust & Savings Bank, Chicago, discussed the subject of municipal aid in electric railway financing. In addition to the remarks that were given in the abstract elsewhere in this issue, he said that a forceful answer to the present condition of railway securities was found in the fact that for the two-year period Jan. 1, 1919, to Dec. 31, 1920, fifty-nine issues had defaulted in the payment of their interest charges. These defaults, which occurred in twenty states, amounted to a par value of $413,000,000, with annual interest accounts of $23,000,000. This condition, he said, presented a serious problem not only for the bankers, who have distributed these securities, but for the companies involved. The aid to be given by the public, he said, should be through better sentiment and more honest public interest.

There was no discussion of the finance papers.

Afternoon Session

At the afternoon meeting, called to order by President Gadsden, Walter A. Draper as chairman presented the report of the committee on the report of the Federal Electric Railways Commission and the report of the special committee on public utilities of the Chamber of Commerce of the United States of America. In presenting the report and recommendations of this committee Mr. Draper told at some length the consideration and detail study which had been given the matter, first by his committee and later by the executive committee of the association when it was brought before the latter. He read the names of the men present at these several committee meetings and informed the convention that the reports had been unanimously approved by the executive committee. Thereupon he moved the adoption of the resolution approving the reports. No discussion developed when President Gadsden placed the matter before the convention and the report was adopted without opposition.

The text of the resolutions as presented by Mr. Draper and adopted by the conference is given in full at the bottom of this page.

C. L. Henry then read a telegram from Thomas N. McCarter which suggested that the association pass a resolution urging that the House of Representatives decline to pass the bill now pending before it which would create a new 2-cent coin, for the reason that such a coin would result in serious financial loss to the electric railways. Particularly on more than 200 properties using the registering type fare boxes it would entail other difficulties in the collection of fares and in the handling of turn-ins in the counting machines and also delay service.

Mr. Henry introduced a resolution embodying these points and it was passed by the meeting. President Gadsden then made a few remarks emphasizing the great desirability of having more discussion at the association meetings and served notice on the members that he was going to do all in his power to see that there is a real debate on the principal issues of the industry at the next annual meeting. He then declared the meeting adjourned.

The Dinner

The closing function of the midyear meeting was the annual dinner, which was served at 7 p.m. at the Drake Hotel. Philip H. Gadsden, president of the American Association, presided. The arrangements for the dinner were in charge of a committee of fifty, of which L. E. Gould, Chicago, Ill., was chairman, and E. B. Burritt, secretary of the association, was secretary.

The after-dinner speakers were Hon. John W. Weeks, former United States Senator from Massachusetts; Hon. James H. Wilkerson, former chairman Public Utilities Commission of Illinois, and Charles A. Leedy of the Youngstown (Ohio) *Telegram*, widely known as a humorous writer and speaker and a member of the board of directors of the American Press Humorists.

Before introducing the speakers of the evening, Toastmaster Gadsden reviewed the present status of the

Resolutions

on Federal Commission and Chamber of Commerce Reports

Whereas, during the last twelve months the Federal Electric Railways Commission, a thoroughly representative body appointed by the President of the United States, and the committee on public utilities of the Chamber of Commerce of the United States have reported the results of exhaustive studies of the electric railway industry, and

Whereas, subsequently the report of the committee on public utilities of the Chamber of Commerce of the United States was submitted to referendum and has been approved by an almost unanimous vote of the membership of the Chamber, representing the opinion of the country's organized business, and

Whereas, no other industry in the country has had the benefit of such complete inquiries into its affairs made on the part of the public, and

Whereas, the fact that such inquiries have been made by two such representative bodies is the highest evidence of the critical situation into which the electric railways of the country had fallen, and

Whereas, while differing somewhat in detail, the two reports agree on the main facts which have contributed to the present situation, and they unite in pointing out the importance of restoration of the credit of the electric railways and in recommending certain broad underlying principles to restore this credit and insure the high class of service which the public requires.

In view of these facts and that the public may know the attitude of the electric railway industry, itself, with regard to these reports and their recommendations, it is hereby

Resolved, by the American Electric Railway Association, in annual midyear conference assembled at Chicago, Ill., that this association does hereby recognize the analyses made by the Federal Electric Railways Commission and by the special committee of the Chamber of Commerce of the United States as being fair and sound statements of the conditions surrounding the electric railway industry today. And it is hereby further

Resolved, that the conclusions and recommendations of these reports with reference to steps which should be taken by both railways and public to rehabilitate electric railway service and credit, for the common benefit of all, are bases upon which the electric railways should join with the public in efforts to meet local conditions. And it is hereby further

Resolved, that the electric railway industry, realizing that the public comfort and convenience as well as the growth and prosperity of communities and of individual business enterprises are largely dependent on electric railway service, hereby places itself on record as ready to do everything in its power to render the most complete service to its patrons, on the lowest possible profitable fare basis consistent with fairness in its wages and working conditions to its three hundred thousand employees, and relies on the public to allow a fair return for service rendered and to establish electric railways on a sound financial basis, which is essential to the general program as outlined by these reports.

electric railway situation and took an optimistic view of what lies in store in the future. A summary of his remarks follows:

OPTIMISTIC VIEW OF THE FUTURE

After outlining the subjects that had been discussed at previous association meetings during the past four years Mr. Gadsden said that we have at last unquestionably passed the peak of high prices both of labor and material. While there has been no appreciable effect as yet upon the operating costs of electric railways growing out of the decrease in the cost of materials, still it is a fact that we are no longer called upon to face increases in the cost of materials or demands for further increases in wage scales. For the first time in four years these questions are not uppermost in our minds and are not insistently demanding our undivided attention. Also for the first time in that period we are enabled to catch our breath and to look around and appraise the damage which has been done; to take account of stock; to marshal the remaining assets and form some intelligent and comprehensive idea of the condition of the industry as a whole. We have all the sensations of victors of a great war. We are survivors of the greatest economic upheaval which this country has ever known. Wages have increased almost 100 per cent. Every class of material entering into the construction and maintenance of electric railways has advanced 150 per cent. With some notable exceptions, the electric railways as a class have succeeded, after desperate effort, in increasing their rates of fare from 20 to 100 per cent. With the exception of those companies which still for one reason or another are compelled to operate under the old 5-cent fare the rates now range from 6 to 10 cents. The average rate of fare throughout the industry is 7.09 cents, or an increase of 40 per cent.

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HON. J. W. WEEKS

CHARLES A. LEEDY

Two of the After-Dinner Speakers

On account of the great proportion which labor bears to the total cost of operation the electric railways have suffered most from the great increase in the wage scale. On account of the obsession on the part of the public over the fixed 5-cent fare the electric railways were the last of any of the public utilities to obtain relief by way of increased fares, and the relief granted was at no time sufficient to offset the increases in the cost of labor and materials which had already been incurred. Instead of being able to put into effect rates which would anticipate the continuing increases in the cost of labor and materials which were obvious to every one, the electric railway industry was compelled to stand the brunt of such increases for months before any relief by way of increased fare could be obtained. We have literally fought our way from a 5-cent fare to a 10-cent fare, every step of the road being fiercely contested.

Notwithstanding an increase in wages of almost 100 per cent and the grossly excessive prices of practically all materials, notwithstanding the unreasonable delays in securing increases in fares, the electric railways during the period of the war and reconstruction have continued to "carry on"; they have continued to render an essential service in a most efficient way. They have carried countless thousands of workmen, whose daily wages had increased from 75 to 150 per cent and in some cases 200 per cent, to work in factories and industrial undertakings of every nature whose profits exceeded in most cases anything ever experienced in business before, while the electric railways were themselves compelled to fight desperately for any relief from conditions which, while threatening their destruction, were rolling up enormous profits to business generally throughout the country.

Notwithstanding the excessive burdens placed upon them by the increased wages and cost of material, notwithstanding the ruinous delay in granting of increased fares, notwithstanding the burdensome paving taxes and excessive taxes of various kinds imposed upon electric railways, in 1920 only sixteen companies out of a total of 943, having a mileage of 992 out of a total mileage of 44,835, with securities of $94,174,230 out of total securities of $4,889,962,096, were forced into the hands of receivers, and the service kept right on. It is true that in order to perform this necessary service to the public, in order to live up to the high standard of service which the industry had established, it was necessary in most cases for companies to pass the dividends on their stocks, but the point is, before sacrificing the service or inconveniencing the traveling public by discontinuing service on unproductive lines, the stockholders of electric railways, and in many cases the bondholders, paid the price, a price which stockholders in no business outside of those regulated by law were called upon to make.

RAILWAYS OPERATED UNDER MOST SEVERE CONDITIONS

Is there any other business or industry which could have survived such treatment? The electric railways have been forced to operate under the worst possible conditions conceivable. The industry as an industry has been manhandled both by friend and foe. It has been ruthlessly exploited. The public has insisted upon its right to a nickel fare long after the value of that nickel had shrunk to 2½ cents. The concentration of population in cities during the war laid enormous additional burdens in the way of increased service upon the electric railways of the country.

And yet today the electric railways are carrying more passengers than ever in their history. That is to say, we are performing a greater service to the public than ever before. We have come out of this great economic encounter strong, efficient, courageous. Was there ever such an instance of inherent strength and stability in an industry? What greater evidence of essential and permanent values can be found as a basis for investment? Everything conceivable has happened to the electric railways, and yet they have survived.

Contrast this with the business world today. After four years of unexampled prosperity, at the first breath of adverse conditions, textile mills, shoe factories, automobile manufactories, steel mills, lumber mills, etc., first reduce working hours, then shut down, throwing hundreds of thousands out of work. Notwithstanding all that has happened to the electric railways, out of two million and more men reported unemployed in the United States today not one is an employee of an electric railway.

The electric railways have no large inventories to be marked down in the face of falling prices. When the whole business world is complaining of poor business, our facilities are taxed to their utmost capacity. From a standpoint of security of the investment, can there be any question that electric railways possess all the elements of a sound and stable investment?

And yet, with all of these elements of stable and essential value, the Federal Electric Railways Commission found officially that the electric railway industry as it now exists is without financial credit. Why is this? What further must be done to restore the credit of the electric railways of this country?

The answer is, fares of electric railways must be flexible, quickly responsive to changing economic conditions. The price charged for transportation on electric railways must bear some proper and definite relation to the character and quantity of the service rendered. Our system of electric railway regulation must be so amended as to provide a method as near automatic as possible whereby fares shall go up or come down with changes in operating conditions. With the revenues of electric railways adjusted so as to cover the cost of operation and provide an adequate return upon investment at all times the credit of electric railways, provided we have the proper financial structures, will rank next to municipal securities.

Already we are beginning to feel the effect of changed conditions. Every reduction in the price of coal, or rails, or crossties, every cut in the wage scale from now on, is going to show itself at once in our operating statements. We have weathered the storm. We have turned the corner. We are on the up grade. Even with present fares it is going to take considerable time to overcome the operating losses of the past four years and overtake the large deferred maintenance on all of our properties. But with steadily declining cost of material and labor, which we can reasonably look forward to, and constant if not increasing traffic, we can see the way out.

So out of the stress and strain of war and reconstruction the electric railways emerge from this dreadful period, having had burned into them the lesson of strict economy, and purged, I hope, of some, at least, of their misconceptions of the part which the public is entitled to play in the conduct of their business; keenly appreciative at least of the public good will and of the public viewpoint; spiritually chastened by their bitter experience, but, nevertheless, strong, self-reliant, proud of their wonderful achievements under most adverse conditions, and, lastly, full of courage to undertake the greater task which the future holds in store for them.

The address of Mr. Wilkerson is abstracted elsewhere in this issue. An abstract of that of Ex-Senator Weeks will be given in a later issue.

Approximately one hundred ladies were guests of the association and after the close of the banquet there was dancing until midnight.

Results of Committee Meetings Held During the Convention

THE special committee on the reports of Federal Electric Railways Commission and the Chamber of Commerce committee completed a draft of a resolution to recommend to the association for adoption.

The committee on company membership decided to follow a program of activity similar to that followed last year. The committee will ask present company members to work actively for new members, and will request all members to make greater use of the company membership emblem. The manufacturing members will be urged to use it on all advertising copy. The next meeting will be held in Pittsburgh, Pa., on April 8.

The committee on mail pay decided to recommend that it be authorized to continue its efforts for further increase in mail-pay rates.

The executive committee decided to authorize the Accountants' Association committee on standard classification of accounts to co-operate with the depreciation section of the Interstate Commerce Commission. The executive committee also authorized the committee on mail pay to proceed as recommended in its report. It also received a report from the publicity committee and approved the report of the special committee on the reports of the Federal Commission and the Chamber of Commerce committee.

Fritz Medal for Sir Robert Hadfield

THE John Fritz Medal Board, representing five leading American engineering societies, has awarded a gold medal for notable scientific and industrial achievement, especially in the invention of manganese steel, to Sir Robert Hadfield. This material was first described by him in 1893, but it did not become generally known until its qualities in the making of armament were realized. Manganese steel has proved of great use in the electric railway industry, especially in track construction, where the importance of wearing qualities predominates.

Among the men who have been awarded the Fritz medal previously are Thomas A. Edison, Gen. George W. Goethals, George Westinghouse, Orville Wright and Alexander Graham Bell.

Dr. Pupin Wins Edison Medal

AT THE midwinter convention of the American Institute of Electrical Engineers, to be held in New York City, Feb. 16-18, the Edison medal, bestowed annually on the scientist who has done most notable work in electrical engineering, will be awarded to Dr. Michael Idvorsky Pupin, professor of electro-mechanics at Columbia University. Not only is Prof. Pupin an eminent physicist, but he has been a leading figure in Serbian-American affairs and is now honorary consul-general in New York for the Serbian government. He was born at Idvor, Banat, Hungary, on Oct. 4, 1858, but has spent his entire professional career at Columbia.

At the annual meeting of the board of trustees of the United Engineering Society Jan. 27 the following persons were elected officers of the society for the ensuing year: President, J. Vipond Davies; first vice-president, Calvert Townley; second vice-president, W. L. Saunders; secretary, Alfred D. Flinn; treasurer, Joseph Struthers; assistant treasurer, George H. Pegram.

This Is the Third of a Series of Articles on the Report of the Federal Electric Railways Commission, Written by a Commissioner

Service-at-Cost Means Co-operation

Electric Railway Labor Has Opportunity Under Service-at-Cost to Co-operate and Benefit from Results of Efficient Operation—Co-operation Between Public, Owners, Managers, Supervisors and Working Forces Is a Certain Result of the Adoption of This Plan — Stabilization of Financial Condition Is Another Result — Jitneys and Motor Buses Cannot Solve the Problem Alone

BY W. D. MAHON
President Amalgamated Association of Street & Electric Railway Employees of America
Member of Federal Electric Railways Commission

A CAREFUL analysis of the report and recommendation of the Federal Electric Railways Commission would seem to lead to the conviction that the commission has placed before the public and street railway companies the logical immediate solution of the problem of municipal, urban and interurban transportation.

The Federal Electric Railways Commission, appointed May 31, 1919, by the President of the United States, had presented to it, as its report shows, the electric railway industry as it now exists at a time when it is without financial credit and is not properly performing its public function. A very exhaustive investigation was made and the solution of the problem may be well quoted in the language of the commission, wherein it says:

W. D. MAHON

> We strongly recommend the principles of the service-at-cost contract, not as the only solution, but as one means of solving a very difficult problem.

I may add to this that my judgment, formed after years of experience and observation in the business, leads me to believe that it is the best solution.

Most important to the common good of all parties interested in street railway transportation is that the method of the commission would impel active and studious co-operation on the part of the public, the owners and the operators. In the mention of operators I mean the managerial, supervisory and working forces who immediately direct and operate the business or, in other words, run the cars.

This active and studious co-operation of the public, the owners and the operators cannot fail under the method advanced by the commission. It cannot fail because of the fact that it at once establishes co-operative responsibility, which is not recognized under the present private ownership and operation. The commission's plan places such co-operative responsibility in a light beyond possible denial and commands immediate active co-operative participation.

CONDITIONS OF EARLY FRANCHISES

Under the present system we may regard the owners—stock and bond holders—as interested principally in obtaining a return upon their investment. Such a return may be operative, or that obtained from the profits of operation, or it may be speculative. There is no disposition on the part of the owners to limit the return. There is a natural ambition to make the property unduly accumulative. Certainly we cannot charge the public with having consciously or actively co-operated to make the street railway properties a success in this line. Yet the speculative aspects of the situation have actually brought the public, face about, to confront the problem as it is today—a result of the public's indifferent tolerance.

Franchises were granted to early promoters under terms and conditions that were made in order to present inviting investments and speculative securities. The franchises were so constructed as to cause the patron element of communities to believe that its interest ended with each ride at the stipulated rate of fare. The tax-paying element sensed in those franchises a lightening of the burden of taxation that was transferred into a liability of the street railway properties, such as paving and other items to which the report of the commission calls attention.

These franchises granted twenty-five, thirty and thirty-five years ago by direct negotiation between the properties and municipalities were made on the basis of the going cost when a 5-cent fare may have been and presumably was an even too liberal concession to the properties; but those contracts, if we may call the franchises contracts, were made upon the basis of the then labor and material prices, which were, approximately, less than one-third of the cost of construction, equipment and operation under present prices. They were made on the basis of the going costs of operation. From that time there has been a progressive increase in the costs of construction, labor, equipment, etc.

Managements of the properties, to render creditable account to the stock and bond holders, were compelled to meet these ever-increasing burdens by passing them along to the wage-earning element of the employees of the property in the way of low wages and undesirable conditions of employment, and to the patrons in the way of inadequate service. When the World War broke out these properties were paying the lowest of wages, were working employees under most embarrassing conditions of exactment and were rendering the least possible service to the public. Also, equipment and roadways were being neglected. The properties couldn't respond fully to the requirements. Bonding possibility had reached its limit.

CO-OPERATION DIFFICULT IN SUCH CIRCUMSTANCES

Certainly there had been cultivated no spirit of co-operation. The properties held out no inducement or attraction to labor. The type of service exacted the contempt of patrons. The results of operation were no longer a credit inducement. How could there be co-operation? It did not exist. The two elements that naturally will be led into co-operative responsibility with the property through the service-at-cost plan were rebelling, and perhaps they had some occasion to rebel. It is certainly conceded that labor may not be comfortably employed in a business that is losing money. We must admit that only that transportation can be afforded patrons which comes within the limit of receipts. In other words, no greater service will be long supplied than that for which patrons pay. How can there be co-operation under such a condition?

Jitney competition, which added greater burdens, rode in on the popular condemnation of street railway properties.

ESSENTIAL TO COMMERCIAL LIFE

Can any one dispute that street railway service is a necessary public utility? Not only is it necessary to life and health in relieving congestion by making it convenient for people to live in rural and urban communities, but it is essential to the commercial life of a large city. It is necessary to our large manufacturers and to the armies of workingmen employed by them.

We all know what an interruption of that service means in the business and social world. Perhaps I am specially competent to know that there is as yet no substitute for the modern street railway. Jitneys, at the most, can be only a makeshift and a very inadequate means of transportation. Modern business cannot continue if dependent upon jitney service alone.

I think the intelligent public will agree with me that it requires a perplexing, distressing wage and employment condition for employees to discredit the directorate or management of one of these properties to a degree warranting them to suspend work or go on strike. And in practically every instance the public declares for the employees and takes sides against the company. Does not this show absence of the spirit of co-operation? Does it not show absence of any co-operative incentive except that which is displayed by the public and employees?

Under the plan recommended by the federal commission the strike method of adjusting differences is abandoned by the substitution of the collective agreement with equitable arbitration enforced by the co-operative spirit. From the fact that capital's return is fixed and labor, organized, stands as an important element of the co-operative management and operation, the lockout is abandoned. This is an added insurance of uninterrupted service. I have every reason to believe that the respect accorded the rights of labor as incorporated in the commission's service-at-cost plan would eliminate the strike and the lockout and enlist the hearty co-operation of employees in effecting and perpetuating an economic service. Employees would recognize their responsibility to co-operate in eliminating waste, preserving property, keeping the rate of fare at a minimum and rendering at all time an efficient and convenient service.

SERVICE AT COST DOES NOT AFFECT MUNICIPAL OWNERSHIP

The commission very clearly enlightens the public and the railway companies upon the fact that the service-at-cost plan not only does not stand in the way of municipal ownership, but so interests the public by actual participation in the management and the operation under the service-at-cost plan that it is better qualified to determine upon the subject of municipal ownership at any future time when the communities interested are prepared to undertake municipal ownership. In the meantime, the municipalities may find themselves operating under a more acceptable arrangement than could be had under municipal ownership and operation.

Under municipal ownership, the municipality assumes the roll of private ownership and operation, with an ever-changing directorate resulting therefrom in political antagonisms not at all of benefit. On the other hand the service-at-cost plan retains the property under expert management with a skilled operating organization in which the public co-operates by means of a supervisory commission or commissioner—all working to the one ideal, an efficient service at the least possible rate of fare.

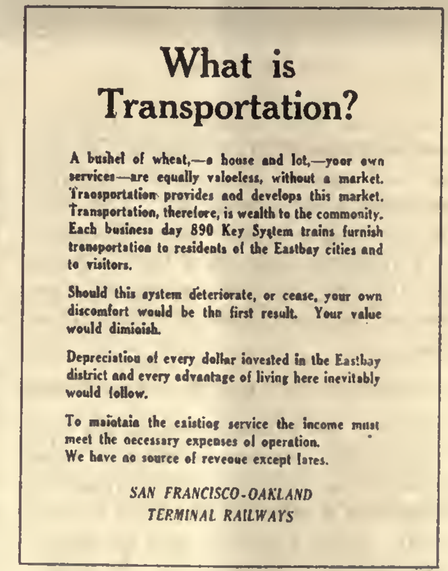
WIDER DISTRIBUTION OF REPORT DESIRABLE

There is much that can be written and said in support of the federal commission's report that would be highly enlightening upon this all-important subject. I believe the government could do a wonderful service by placing copies of the commission's report in the various homes in our large cities. May there be some means of obtaining such publicity.

If this were done, I believe it would lead to the early adoption of the commission's recommendation by various municipalities.

Transportation Essentiality Demonstrated

THE accompanying advertisement, prepared recently by the San Francisco-Oakland Terminal Railways, Oakland, Cal., is a straightforward plea for logical consideration of the fare question. It is the kind of publicity material that is calculated to set the minds of the railway's patrons to work.



What is Transportation?

A bushel of wheat,—a house and lot,—your own services—are equally valueless, without a market. Transportation provides and develops this market. Transportation, therefore, is wealth to the community. Each business day 890 Key System trains furnish transportation to residents of the Eastbay cities and to visitors.

Should this system deteriorate, or cease, your own discomfort would be the first result. Your value would diminish.

Depreciation of every dollar invested in the Eastbay district and every advantage of living here inevitably would follow.

To maintain the existing service the income must meet the necessary expenses of operation.
We have no source of revenue except fares.

SAN FRANCISCO-OAKLAND
TERMINAL RAILWAYS

RECENT EXAMPLE OF PUBLICITY MATERIAL FROM THE PACIFIC COAST

Train Operation in New Jersey

After Tests Covering Various Operating Conditions, in Which Considerable Research Work Was Done and Both the Theoretical and Practical Aspects of the Subject Were Given Full Consideration, the Public Service Railway Adopts Trailer Operation on a Large Scale—Details of Recent Tests Are Given

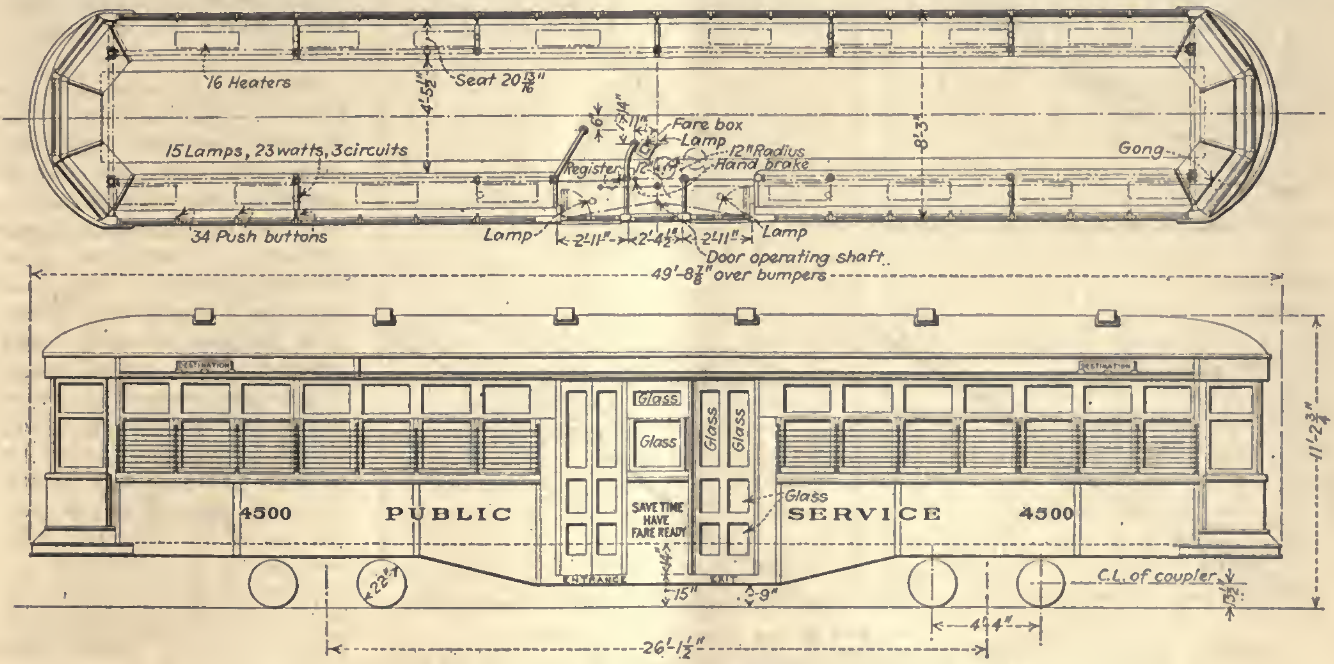
MOTOR CAR WITH TRAILER OF NEW TYPE, PUBLIC SERVICE RAILWAY

THE Public Service Railway, with headquarters at Newark, N. J., has received the first of an order of 100 trailers from the Osgood-Bradley Car Company. This forerunner of the large group of cars has been in operation in Newark for several weeks with good results.

The use of trailers is a comparatively new development on this property, although multiple-unit trains have been used for several years. The company has done considerable research work in the field of train operation, and the present plan involving the use of light trailers rather than multiple-unit cars is the result of an evolution in which both the theoretical and practical aspects of the subject have been given full consideration.

About eight years ago the company made a series of train tests which were summarized in the issue of this paper for July 5, 1913, page 10. These tests were the result of the necessity for increasing track capacity during the rush hour on certain sections of the property. They demonstrated the practicability of train operation under local conditions, and the effect in slowing up schedules was found not to be so serious as to offset the greater carrying capacity of the train unit. In the tests the characteristics of a single car, a multiple-unit train and a motor car and trailer were compared, with the result that the multiple-unit train appeared to be the best.

Following the test period a number of trains were put in operation on the property and are still giving



PLAN AND ELEVATION OF PUBLIC SERVICE RAILWAY TRAILER

NEW TRAILER FOR PUBLIC SERVICE RAILWAY

good service. A number of trains were made up with two cars equipped with two 50-hp. motors each, on maximum-traction trucks. These were permanently coupled, the four motors on this train being handled like a four-motor equipment on a single car, with a bus line connecting the two cars. This type of train has not proved satisfactory, for these among other reasons: First, on stiff grades with heavy loads the traction in wet weather or on wet rails is not sufficient to maintain speed, hence the line is "slowed down." That is, the drivers slip and spin too much to permit the making of schedule speed. Again the unit gives trouble at switches, the derailments being too frequent for dependable operation.

A better train was found to be one made up of four-motor cars with H L multiple-unit control, and 128 cars so equipped were put in service. These cars have the advantage of ease of coupling and uncoupling, and the plan was to use them singly or in trains as the exigencies of the service required. As a practical operating proposition, however, it has worked out that the administrative difficulties in the carhouses in getting trains made up and broken up at the right times have worked against the use of the cars other than as single units. The consequence is that the multiple-unit train has proved somewhat of a disappointment, and in expanding train operation the trailer plan has been adopted. It is felt that the extra expense for equipment and control is not warranted under the conditions, particularly as later tests show that practically as good results can be secured with the trailer plan.

THE 1920 TESTS

During the war and early post-war periods the Public Service Railway found itself confronted with a tremendous rush-hour problem in Newark. This was the center of a great industrial development and the handling of the thousands of workmen employed in the vicinity, with provision for the expected larger numbers, brought train operation into the focus of interest again. This was the reason for the large investment in the new trailers. Since they were ordered there has been a temporary slump in the local industries so that the trailers will not at once be used in their intended service, but they will be distributed to points of maximum rush-hour congestion.

To determine the probable effect of the trailer operation on the schedules and on the equipment of the motor car some service tests were made last spring with the single car (four motors), the 4-4 motor train (four motors on each of two cars), the 4-2 motor trains and the 4-0 motor train (motor car and trailer). These tests were made on the Springfield line, Newark, and they covered the morning and evening rush hours for four days, from March 29 to April 1, 1920.

The data secured were as follows: Leaving time, arriving time, schedule trip time, actual trip time, per cent off schedule time, mileage of trip, total number of stops, average number of stops per mile, average duration of stop, total duration of passenger stops, total duration of delay stops, schedule speed, actual speed, actual speed exclusive of stops, number of passengers interchanged, average number of seconds per passenger interchanged, percentage of passengers off by front exit, percentage off by rear exit.

Some of the results of the tests are shown graphically in Figs. 1 to 4. These show averages for the four days.

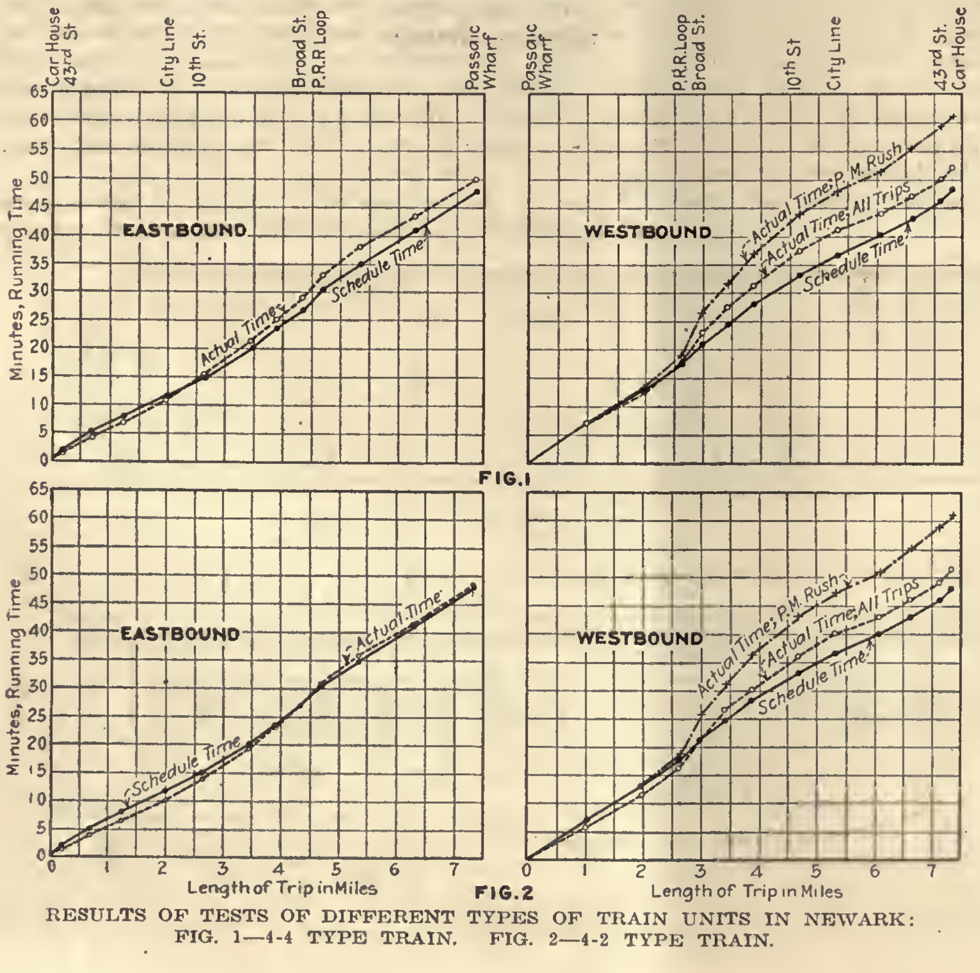


FIG. 1

FIG. 2

RESULTS OF TESTS OF DIFFERENT TYPES OF TRAIN UNITS IN NEWARK: FIG. 1—4-4 TYPE TRAIN. FIG. 2—4-2 TYPE TRAIN.

On the first of these days the prevalence of a fine drizzle resulted in slippery rail, but particular attention was given to sanding to offset this. On the other days conditions were practically perfect. The results show that under conditions of the test there was little difference among the units so far as adherence to schedules was concerned. The following table, which covers averages of twenty-four trips, indicates this:

RESULTS OF TRAIN TESTS IN NEWARK

Type of Train	Per Cent Adherence to Schedule	Stops per Mile	Average Number of Passengers Carried per Trip	Number of Trips Made in Schedule or Better
4 = 4	108.1	6.4	76	6
4 = 2	102.2	5.4	71	12
4 = 0	105.4	6.6	83	8
Single car	106.8	6.3	66	11

The 4-0 train was very slow on grades, often not starting until the third point on the controller was reached, picking up very slowly until that last two points had been attained and then going with a jerk. Starting conditions were better on the level. There was a perceptible jerk on the second car on stopping and starting. The public, being unused to this train arrangement, was slow in boarding the second car, consequently the load on this was small except on the heaviest of the rush-hour trips. The tests did not show what would have occurred if track conditions had not been good. The train would presumably encounter some difficulty on the grades.

The 4-2 train started almost as smoothly as the 4-4, although in the test the latter naturally shows up best of all. The former, however, made somewhat fewer stops per mile and carried fewer passengers.

In a comparison between the 4-4 and 4-2 trains, the latter was seen to be as good as the former for all practical purposes, while the 4-0 train was evidently all right for fairly level routes or on reasonable grades with good track.

Figs. 1 to 4 show that all units can hold schedule outside the congested districts, which lie largely between Tenth Street and the Pennsylvania Railroad loop. In the congested districts the traffic and the traffic officer have more influence on the operation of the cars than the equipment or the motorman.

One might ask why the schedule should not be fitted to the actual rush-hour condition. To this the company replies that it is better to set the schedule to suit the non-rush hours and to adjust the layover, over which the timetable department can exert control, to provide for delays.

The new operating unit will comprise a motor car of the "2200" type and a trailer of the "4500" type. The motor car is equipped with four 40-hp. motors. It is single-end, and 100 of the type are in operation.

CONDUCTOR'S STATION IN NEW PUBLIC SERVICE TRAIL CAR

The trailer is in most respects similar in design to the latest Cleveland trailer. It is mounted on the Osgood-Bradley Car Company's light archbar swing-bolster trucks and weighs fully equipped, with farebox, 23,300 lb. The trailer has been made as simple as possible and longitudinal seats are provided to furnish the maximum capacity. As many as 180 persons can be accommodated with reasonable comfort, and in a pinch 200 can be carried.

Both motor car and trailer are wired for passengers' electric stop signals, but clapper bells are used for the start signals. The conductor's station is near the middle of the car, between the doors and facing toward the rear. Railings are installed on the trailer so that entering passengers pass to the conductor's right and distribute themselves throughout the car after paying their fare. The arrangement is such that he has ideal control over passenger interchange.

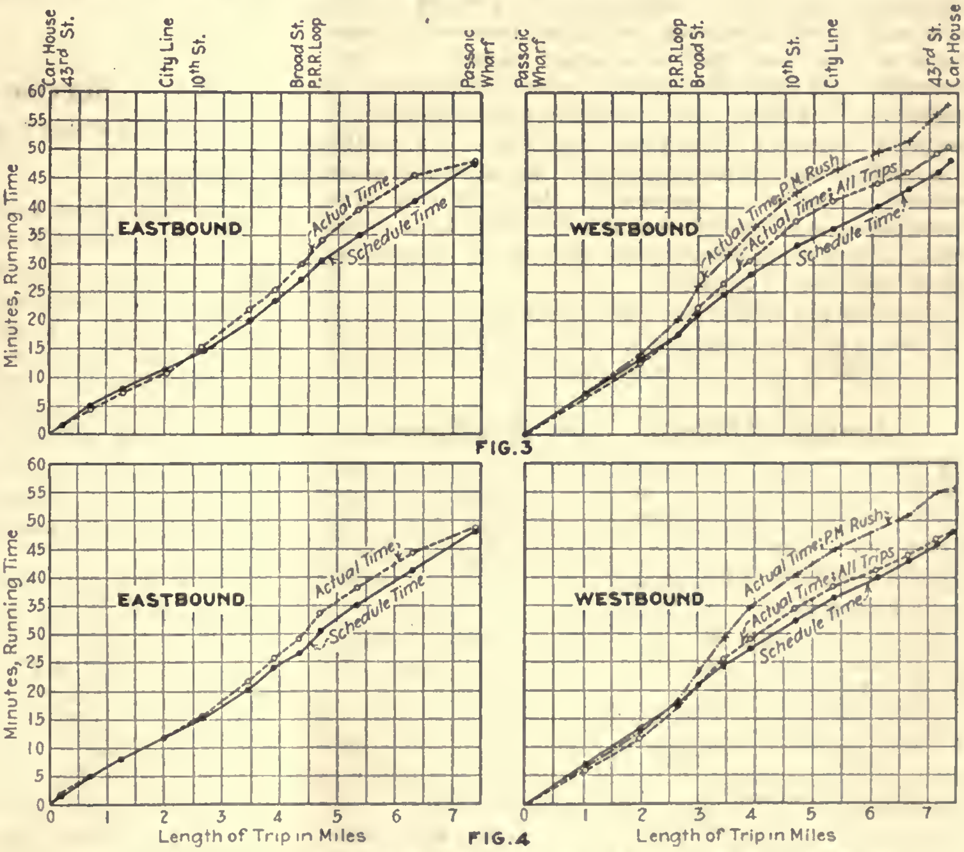


FIG. 3

FIG. 4

RESULTS OF TESTS OF DIFFERENT TYPES OF TRAIN UNITS IN NEWARK: FIG. 3—4-0 TYPE TRAIN. FIG. 4—SINGLE CAR

Association News

Joint Utility Committee Appointed

A JOINT committee of three of the national utility associations has been organized by the American Gas Association, the National Electric Light Association and the American Electric Railway Association. The purpose of the committee is to promote co-operation and each of the organizations mentioned has designated a group to represent it as members of the joint committee, which, as at present constituted, consists of:

Randall Morgan, B. C. Cobb, Frank W. Frueauff, H. G. Bradlee, Lucius S. Storrs, Charles A. Munroe, Joseph K. Choate, E. C. Faber, J. B. McCall, John W. Lieb, R. A. Carter, O. D. Young, Henry L. Doherty, S. Z. Mitchell, P. S. Young, P. H. Gadsden, W. W. Freeman, Charles L. Edgar, A. P. Lathrop, B. I. Budd, M. H. Aylesworth, E. B. Burritt and O. H. Fogg.

Committee on Safety Meets

THE joint T. & T. and Claim Associations committee on safety met at association headquarters on Feb. 2. Those present were E. C. Spring, Lehigh Valley Transit Company, Allentown, Pa., chairman; R. E. MacDougall, New York & Harlem Traction Lines; H. V. Drown, Public Service Railway, and J. W. Welsh, special engineer of the association.

The committee plans to send a request to member companies for information covering accidents, their costs and what has been done during the past year in the way of safety-first campaigns. The report for the year will carefully analyze the replies received. Deductions will be drawn and an attempt made to show the necessity and need for electric railway companies cooperating with local safety councils and committees in accident reduction. The committee will also urge that the local electric railways give both moral and financial support, so far as is possible, to the work now being undertaken and carried forward by these local safety councils and committees in the interest of reducing all kinds and types of accidents.

It is planned to hold the next meeting the latter part of March, at which time it is hoped much of the information sought will have been received.

January Bulletins Now Available

THE following special reports and compilations have been prepared by the Bureau of Information and Service of the American Electric Railway Association during the month of January, 1921. Any or all of these reports may be had by member companies upon request to Secretary E. B. Burritt.

Rate of Return.—Twenty recent decisions of public utility commissions where the rate has been fixed after an official appraisal.

Effect of Business Conditions on Passenger Traffic.—A comparison of the last four months of 1920 with 1919, showing separately the situation of a number of companies both with and without fare increases.

Interurban Rates of Fare.—This shows the present and former rates, effective dates and whether on a mileage or zone basis, etc.

Analysis of Agreements Covering Working Conditions of Trainmen.—Supplementing report of last month.

Supplement on Trackless Trolleys.—This includes descriptions of systems in Bradford and Tees-Side, England, and Wurzen, Saxony, a proposed alternating current system, and a bibliography of all articles up to date.

The bulletins on city fares, wages of trainmen, cost of living and cities having motor bus service have also been brought up to date.

Letters to the Editors

Interurbans Need More Attention

THE WINONA INTERURBAN RAILWAY COMPANY
WARSAW, IND., Feb. 1, 1921.

To the Editors:

The editorial under the caption "The Interurbans Require Greater Attention," in the Jan. 1 issue of the JOURNAL, sounds a keynote that should arouse considerable interest.

You will remember that in a letter to you some months ago I contended that strictly interurban problems had become entirely lost in general publicity campaigns, so that in looking at the traction situation as a whole the general public could see only the street car problems of our larger cities.

I am still insisting that interurban transportation is entirely different in character than city street car service, and am glad to see your valuable publication take the matter up editorially.

J. C. SCHADE,
General Manager.

Service in Cincinnati

DEPARTMENT OF STREET RAILROADS
CINCINNATI, Jan. 28, 1921.

To the Editors:

The article from Lucius S. Storrs in your issue of Jan. 1 is so valuable that I hesitate to say anything that might be construed as a criticism. However, the statement that I ordered a reduction of service in order to keep down fares is susceptible to some misinterpretation. What I did order was a readjustment of service by reducing service in the non-rush period, where it was excessive, and applying it to the rush hour, where it was needed. This resulted in a saving of $500 a day in platform time, and actually improved the service during the period when the people are riding. No headways were reduced enough to cause any material inconvenience.

The footnote on page 17 gives the area of Cincinnati as 58 sq. miles. The area of Cincinnati proper is 72 and the area served, including contiguous communities, is 83.27 sq. miles, with a population of 454,000.

The density of population is low, and as a consequence the density of traffic is lower than in most cities, being only a little over 4 on some lines, with an average of 5.5 for the entire city. These long hauls through sparsely populated territory are characteristic of Cincinnati and affect the car-mileage costs and consequently the rates of fare.

W. C. CULKINS, Director.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Franchises Canceled

Chicago Council Acts to Nullify 1907 Ordinances—Disposal of $25,000,000 Traction Fund a Poser

The City Council of Chicago, Ill., on Feb. 4, voted to cancel the 1907 traction contract-ordinances with the several companies constituting the Chicago Surface Lines. The considerations leading up to this action were quite fully reviewed in the ELECTRIC RAILWAY JOURNAL for Feb. 5, 1921.

There is some question as to what effect this action of the City Council will have upon the franchise situation. Inasmuch as these ordinances were originally adopted by referendum vote, it is probable that action of the same authority will be required to cancel them. Furthermore the companies have not been a party to the cancellation.

The action will probably hasten the decision of the Circuit Court, which has had before it for several months a petition from the city hall to cancel the contracts. If this court should hand down a decision declaring that the contracts had been abrogated by the companies by the steps they have taken in violation of the contract provisions but in keeping with the orders of the State Public Utilities Commission, it is quite probable that the matter would be appealed to a higher court.

The ordinance passed by the City Council carried with it instructions to the law department immediately to petition the new Public Utilities Commission to order track extensions amounting to about 110 miles, and other service improvements.

When the City Council was about to vote on the cancellation of the contracts, an Alderman raised the question whether the city would not thereby lose its right to the 55 per cent share of the net profits of the companies. The city law department admitted that it would. The city's share of the profits for 1920 will be approximately $2,100,000. The sum of approximately $1,700,000, which accrued to the city for the fiscal year ended Jan. 31, 1920, has not been paid, since the city hall declined to accept it because it was alleged that in so doing it would acknowledge the contract ordinances to be in effect, whereas it had declared them abrogated.

The traction fund has accumulated about $25,000,000, which was to be used, according to the ordinances, in the purchase of the traction lines or in building subways. If the contracts are canceled, there is some question as to how this fund may be disposed of. According to a State Supreme Court decision, the city has no power to divert this fund to general corporate purposes. The city's special traction counsel has suggested that the city might construct subways with this and lease them to the proposed transportation district boards. It is quite probable that the General Assembly will want detailed information about this fund, when it comes to the consideration of the proposed act which would create the transportation district and bring about public ownership.

According to one of the Aldermen, it is the intention of the city administration to submit the Mayor's plans for a transportation district to the voters at the election on Feb. 22. This is, however, probably impossible.

Ousting of Commission Heard

The Court of Errors and Appeals of New Jersey on Jan. 19 heard argument in the appeal of the State Public Utility Commissioners from the recent decision of the Supreme Court which upheld Gov. Edwards' power to remove the board and name a new commission. The Supreme Court's ruling was the result of quo warranto proceedings brought in the name of the State by Attorney-General McCran, questioning by what right the utility board continued in office after the Governor's order of ouster.

The old board is not fully functioning, and the new board appointed by the Governor to take the place of the ousted commissioners cannot act until the Senate confirms the names of the appointees.

Violence Follows Attempt to Restore Service

Violence attended the effort made on Feb. 8 by the United Traction Company to restore service on its lines in Albany and Troy, N. Y. No attempt was made at first to run cars in the Cohoes, Watervliet, Rensselaer or any of the villages served by the company's lines.

The effort to restore service was made under orders of the Public Service Commission for the Second District in the face of the opposition of 1,200 employees, who went on strike more than a week ago in protest of a wage reduction from 60 to 45 cents an hour.

A great deal of damage was done to the overhead work in Albany by the strikers and their sympathizers so that no cars were run there on Wednesday. Attempts at repair work, however, resulted in so much disorder that the need was felt for the State Police to use their pistols to quell the rioting.

The only car sent out in Troy that day was stalled by the wires being cut.

Toledo's Trial Week

Traffic Increased 7 per Cent Under Lower Fare, but the Earnings Decreased 5 per Cent

The first week of operation of the railway system of Toledo under the Milner service-at-cost ordinance by the Community Traction Company has resulted in an increase of 7 per cent in passengers carried.

A. Swartz, superintendent of transportation, declared the decrease in fares from 7 to 6 cents ought to be responsible, according to past experience, for a gain of about 5 per cent in riding. It is thought the other 2 per cent gain is due to the feeling on the part of the public that the railway system is semi-publicly owned and controlled under the new plan.

The decrease in fares, however, has resulted in a decline of 5 per cent in the revenues derived from the passenger service.

The reduction in the charge for fares from 7 to 6 cents and in the charge for transfers from 2 to 1 cent means a reduction of approximately 12 per cent on the local lines.

The offices of the Community Traction Company, have been set up in the fourth floor of the Toledo Railways & Light building, the entire floor having been turned over to the new company.

As will be noted from the figures on the first week's traffic, the railway is losing over what it was doing on the seven and two rate of fare. What effect this will have upon the stabilizing fund cannot yet be determined. However, all officials of the Community Traction Company and the commissioner are trying to cut expenses of operation to the bone in order to prevent an increase in fare at the end of the first six-month period.

JITNEYS MUST GO

The Rail-Light lost approximately $700 a day from jitney competition during the last year. No complaint was made by the Rail-Light, but the public has begun to take up the matter since the new ordinance has gone into effect, it being realized now that additional revenue of $700 a day to the railway would tend to bring down fares.

The railway campaign against accidents has also received impetus from the turning over of the property to the Community Traction Company as savings in these accounts now have a direct bearing on the fares charged.

W. E. Cann, the new street railway commissioner at Toledo, has entered upon his duties. A portrait and a biography of him are published elsewhere in this issue.

Seattle Drove Poor Bargain

City Paid $15,000,000 for Property Investigator Reports Worth $7,843,000—Rescinding of Purchase Recommended

Presiding Judge J. T. Ronald of the Superior Court of Seattle, Wash., has received the report of the King County Grand Jury's investigation of the purchase of the railway lines of the Puget Sound Traction, Light & Power Company at Seattle by the city. The Grand Jury finds that the terms of the city's contract cannot be fulfilled. It says that the city is entitled to equitable relief and that the City Council should take steps to obtain such relief. It considers the lines taken over at $15,000,000 by the city to be worth only $5,000,000. It also says that if the city completes the purchase according to the contract the cost will be $23,752,550 in principal and interest.

AT THE same time Wilmon Tucker, special investigator for the Mayor, has reported to Mayor Caldwell that the company is guilty of constructive if not actual fraud with reference to the value of the railway property.

He says that the city should be relieved of the unjust burden.

WHEN THIS TAKES EFFECT YOU OUGHT TO BE ABLE TO HOP ALONG UNTIL WE FIND A CURE FOR YOUR CASE.
FARE INCREASE
DR. COUNCIL

SEATTLE "TIMES'" IDEA OF FARE INCREASE

The Grand Jury goes on to say that "the city has taken over a property which was earning less than 2 per cent on $15,000,000 and has undertaken not only to pay 5 per cent interest on $15,000,000 of utility bonds but also to pay out of the gross revenues of the system the entire amount necessary to retire the bonds in twenty years in addition to operating and maintenance expenses and depreciation. In our opinion it cannot be done."

The text of the report of the Grand Jury is concerned very largely with the history of the negotiations, all of which were followed closely in the ELECTRIC RAILWAY JOURNAL at the time. The findings of the Grand Jury are scattered throughout the report of that body.

The Grand Jury agrees with Mr. Tucker that at the time of the purchase the fair physical value of the property in its then depreciated condition was not to exceed $7,843,000. That body says, however, that the earnings of the system had been such that considering it as an investment on the basis of its revenue earning capacity the jury believes that at the time of the transfer to the city it was worth not more than $5,000,000.

The principal findings of the Grand Jury detached from the text are as follows:

> It appears from the evidence that no proper or sufficient investigation was made by the city authorities to ascertain the true value of the system which the city was proposing to buy.
>
> What would seem to the jury to be the most important and the one indispensable precaution to have taken before binding the city to such an agreement would have been to have an actual physical appraisal of the properties made. This was never done.
>
> After diligent search and investigation of all sources of information known to this jury we feel it only fair to those individuals in public office or otherwise, whose names have been mentioned in connection with the deal, to say that we find no evidence of corruption and nothing tending to show that anyone holding an official position with the city profited financially by the transaction. The jury has attempted to trace certain rumors of corruption which have been called to its attention, but in every instance it has concluded that such rumors were founded on idle talk by individuals having no knowledge of the facts.
>
> On the basis of the evidence submitted and available to the jury, however, it appears that the negotiations leading up to the purchase were characterized by slack business methods on the part of the Mayor and Council. We find nothing which subjects the city law department to criticism in connection with this transaction.
>
> In view of the apparently extortionate price paid for the properties we feel that the public should be advised of the facts indicating how the purchase of the street railway system came to be made.
>
> The terms of the contract were never agreed upon or made known until long after the vote of the people taken on Nov. 5, 1918. This vote was taken without authority of law. The final contract was not executed until long after the war emergency had passed.

NOTHING LEFT FOR PUBLIC, ACCORDING TO SEATTLE "TIMES"

> We find that if the city of Seattle completes the purchase of the street car lines, according to the terms of the contract, that the people will pay $15,000,000 principal and $8,752,550 in interest, a total of $23,752,550, and in the same period of time it will be practically necessary to reproduce the system.
>
> In addition to these figures the city will have lost by reason of the fact that under the ownership of the Puget Sound Traction, Light & Power Company 2 per cent of the gross receipts were paid to the city, which no longer will be paid, in a period of twenty years a sum estimated at over $3,750,000, and will have lost in the same period in taxes formerly paid by the traction company approximately $4,601,280, making in all a total of over $32,103,830.
>
> In this connection it should be borne in mind that by the terms of the contract the city has bound itself to purchase power from the Puget Sound Traction, Light & Power Company or purchase power from that company until such time as the city sees fit to buy the substations now belonging to the Puget Sound Traction, Light & Power Company, which were not included in the original purchase, these substations to be purchased at a price based upon the then reproduction cost of such substations, less depreciation.
>
> We find further in connection with the operation of the street car system by the city that there has already been charged to and paid out of the general tax fund, and not out of the city railway funds, during the year 1919, the sum of $105,725, and in the year 1920 $117,803.
>
> The present financial condition of the system, which is a matter of public knowledge, is not in our opinion due to mismanagement of the lines since the city acquired them.
>
> The city has taken over a property which was earning less than 2 per cent on $15,000,000 and has undertaken not only to pay 5 per cent interest on $15,000,000 worth of utility bonds, but also to pay out of the gross revenues of the system the entire amount necessary to retire said bonds in a period of twenty years, in addition to operating and maintenance expenses and depreciation. In our opinion it cannot be done.
>
> From the evidence submitted and available we believe this contract is incapable of performance according to its terms. We believe that the evidence in the hands of the Mayor and otherwise available shows facts such as should entitle the city to equitable relief.
>
> We, therefore, recommend to the City Council that it take the necessary steps to secure the same.

As stated previously Mr. Tucker charges constructive if not actual fraud with reference to the value of the property turned over to the city in the $15,000,000 purchase. He recommends in brief that the City Council return the property taken on the contract and ask the return of the bonds issued in payment for the lines, and recommends that in the event the Council is unwilling to take such action the taxpayers themselves initiate legal proceedings to relieve themselves from the unjust burden.

The Mayor concurs in the recommendations of Mr. Tucker. He further advises the employment of Mr. Tucker as counsel to assist the Corporation Counsel in any legal action that the Council may take. Mr. Tucker's report was sent to the Council accompanied by a letter from the Mayor, in which the latter says that while some may be disappointed that the investigation disclosed no graft or corruption the reports of the Grand Jury and of Mr. Tucker justify every statement the Mayor has made in connection with the purchase either during his campaign or subsequently.

Mr. Tucker says that the property as of the purchase date represents a value not to exceed $7,843,000. In concluding his report Mr. Tucker says:

> The city of Seattle has not invested any of its money in the street railways and has not agreed to do so. It is in the position of a trustee, having taken possession of the lines under an agreement to pay the former owners first and the necessary operation expenses thereafter, and it has been demonstrated that the instrument creating the trust is incapable of performance according to its terms.
>
> In the event that the company is not willing to rewrite the contract upon a fair and just valuation and under terms that can be performed, the trustee (the city of Seattle) is in a position to restore the com-

pany to its former position. It has paid to the bondholders, for the company (for the latter was obligated to pay them under the terms of the mortgage for which the bonds were substituted), 5 per cent on the full $15,000,000, or to date $1,125,000, which can be regarded either as interest, dividends or rental for the property. The city has paid to the Stone & Webster interests for power with which to carry out the terms of trust, during 1919 and 1920, the sum of $1,103,101, about half of which is clear profit to the former owners of the lines.

When it is considered that for five years immediately preceding the taking over of the lines by the city the company was making five-eighths of 1 per cent on a basis of $15,000,000 and since that time it has been receiving full 5 per cent on the $15,000,000 it is apparent that the lines were turned over to the city under a contract pursuant to which the company could not lose, and it has been amply compensated in every way.

From my investigation of the facts and the law I have reached the following conclusions:

1. That the company was guilty of constructive if not actual fraud with reference to the value of the property, by which the city was induced to agree to pay more than twice its real value.

2. That the contract is impossible of performance according to its terms, and the city is under no obligation to enhance the value of the bonds by furnishing additional funds or security in an endeavor to carry out the contract.

The case of Twitchell vs. the City is not determinative of the city's right, as the way is left open to show in a proper proceeding by actual proof that the contract cannot be carried out by the city on the plan adopted without invasion of tax funds.

I advise that the city make an offer to rescind, tender back all the property and ask for a return of the bonds. If the tender is not accepted the city should bring an action in equity to rescind the sale. If the City Council does not wish to do this, and takes the position that it is satisfied with the sale, as it apparently did in the Twitchell case, then taxpayers should institute appropriate legal proceedings to relieve us from the unjust burden.

Campaign Against One-Man Cars

Plans are being made to induce the passage by the Missouri Legislature of a bill to prohibit the operation of one-man cars in St. Louis, Kansas City, St. Joseph, Springfield and Joplin, the five largest cities in the State. The measure would require a motorman and conductor on every car and one additional man for each trailer. It follows:

An act to amend article 5, chapter 33 of the Revised Statutes of Missouri, 1909, entitled "Corporation, private" by inserting after section 3303a thereof a new section to be numbered section 3303aa.

Be it enacted by the General Assembly of the State of Missouri, as follows:

Sec. 1. Amending article 5, chapter 33, by enacting new section.... That article 5, chapter 33, of the Revised Statutes of Missouri, 1909, entitled "Corporations, private" be and the same is hereby amended by inserting after section 3303a thereof a new section to be numbered section 3303aa and to read as follows:

Sec. 3303a. . . . It shall be the duty of every corporation, company, individual, association of persons, their trustees, lessees or receivers, that now or hereafter may own, control, operate or manage any street or electric railway in any city in this state containing more than seventy-five thousand inhabitants to provide not less than two employees or agents for the operation and control of each one of its cars, provided, that in cases where two or more cars are attached to each other then not less than two employees or agents shall be provided for the operation and control of the first of said cars and one additional employee for each additional car.

A similar measure is being agitated in Iowa. Charles Rogers, president of the local union of Amalgamated Association in Davenport, is quoted as follows:

> We have a mass of information on these cars and their operation all over the Middle West. We have no occasion to use it now but when the question crops up in a way to affect labor we will be able to back whatever stand we take with sufficient evidence.

Municipal Railway Crossing Illegal

Court Orders Discontinuance of Service Over Crossing at Detroit City Stole in Defiance of Injunction

Judges Ray Hart of Midland and Clayton C. Johnson of Coldwater decided on Feb. 4 that the crossing of the Mack Avenue tracks of the Detroit United Railway by the city railway was illegal. In consequence operation of the municipal cars over the St. Jean crossing was discontinued Saturday afternoon, but not until Elliott G. Stevenson, attorney for the Detroit United Railway, had requested Clarence E. Wilcox, Corporation Counsel, to stop the city cars from crossing Mack Avenue. A further court order had been expected by the Street Railway Commission than that contained in the original injunction allowed by Judge Dingeman and violated by the city.

The judges held in the opinion handed down that city wires touching the Detroit United Railway wires must be disconnected. The crossing was not ordered removed. Tracks and wires are to be disconnected upon the order of Mr. Goodwin, municipal railway manager, as soon as possible, as a result of the judges' decision.

Judge Dingeman's restraining order was held valid and the judges' opinion also stated that the order was properly served by E. J. Burdick, assistant general manager of the Detroit United Railway, before he was arrested by the police and taken to Belle Isle. It is also held by the judges that the crossing was not properly constructed from an engineering standpoint.

The court held that although a mandatory injunction could be issued compelling the removal of the crossing, and while it believed that the crossing should be restored to its original condition, it also believed that the people should not be inconvenienced by having the tracks, wires and road bed again torn up.

The writ provides for the disconnection by the city of its tracks, and all connecting wires from the tracks and wires of the company in such a manner that no electric current will be diverted from the company's tracks and wires, and the city is restrained from using or crossing the street railway tracks of the company with city cars or wires at the intersection of the streets mentioned, until further order from the court. The motion of the city to dissolve and vacate the restraining order issued by Judge Dingeman, is denied by the court.

In reviewing the evidence, the court, in accord with the contention of the Detroit United Railway is of the opinion that if Mr. Burdick did not succeed in making a complete service of the restraining order it was due to the interference and conduct of city officials and employees. The city officials are held to have had sufficient knowledge of the purpose and terms of the order to have observed the provisions and refrained from constructing the intersection until the legal rights could have been finally determined by the court.

As a result of the decision application will be made to the Wayne County Circuit Court to have the city's right determined relative to crossing the Detroit United Railway tracks with the municipal ownership tracks. This right or lack of right was not discussed in the opinion of the judges who heard the arguments in the case last month. The form of mandatory order which the Detroit United Railway asks of the judges conforms in general with the one outlined in the court's opinion.

Much depends upon the action the higher court takes upon this question of crossing, since several of the other proposed municipal lines are planned to cross Detroit United Railway tracks. The Municipal system would be seriously hampered in event the Supreme Court upheld an order restraining the city from making the crossings.

Passengers using the St. Jean line after the cars were stopped from crossing Mack Avenue were given car-to-car transfers and had to walk across the Detroit United tracks.

According to Mr. Goodwin, the car schedule has been worked out so that no waiting for connections will be necessary. The municipal ownership cars which are shut off from the temporary St. Jean carhouse by the Mack Avenue crossing are being left at night at the end of the line in care of a watchman. Necessary repairs made in the open. Two steam road crossings have been installed eliminating the two former breaks in the municipal ownership line at these points.

Secretary and Securities Disappear Simultaneously

Warrants issued on Feb. 1 at Minneapolis for Berger T. Jaeger, until a week before that confidential secretary of A. M. Robertson, president of the Duluth Street Railway, revealed that coincident with Jaeger's disappearance on Jan. 25 negotiable securities to the amount of $157,000 of the Duluth company also disappeared.

The police of eastern cities have been notified to be on the lookout for Jaeger. He was one of Mr. Robertson's most trusted employees.

Herbert Warren, vice-president and general manager of the railway company at Duluth, has said that the securities had been held in reserve for the purpose of paying taxes and bond interest of the company and that the theft was not protected by any security company. The securities missed include $80,000 in United States Treasury certificates, $25,000 in Canadian Northern bonds and $52,000 in British Goverment bonds.

The warrant for Jaeger is based on the disappearance of a check for $4,825.

Expert Not Enthusiastic

Dr. Wilcox Sees Perpetuation of Strife Between State and City Under Governor Miller's Plan

The discussion that has been precipitated by the message of Governor Miller to the Legislature of New York on the public utilities is characterized by so much positiveness and so much opposition that the still, small voice of moderation can hardly make itself heard. This was the opinion expressed by Dr. Delos F. Wilcox, speaking before the City Club of New York on Feb. 7. Dr. Wilcox said that the Governor's plan strives to do the impossible. As he saw it the Governor went as far as he could in taking away from the municipality the power of control, but the city would still be clothed with power to obstruct action through its constitutional control over routes and through its conceded control over the use of city funds. It was the opinion of Dr. Wilcox that if in the nature of the case co-operation of state and local authorities was an essential condition precedent to a wise solution of the problem it would be fatal to proceed in such a way as further to arouse the spirit of antagonism between the city and the state.

He said the club was practically in complete accord with the Governor's declared objective, but was sure the Governor's plan for a state-appointed commission clothed with all the state powers of action was the wrong method of approach to a solution of the problem. It was his opinion that the Governor need not fear the attitude of the people of New York if the plan to be devised by the Governor's commission should prove to be all that he promised for it. The Governor's commission might be able in the face of local opposition to raise fares. It could not, however, bring about a permanent and salutary solution of the entire problem without local co-operation.

Dr. Wilcox summarized his remarks as follows:

> The Governor's ultimate objective as outlined in his message of Jan. 24 is almost wholly in harmony with the ultimate purpose to which we have long given our support.
>
> The Governor's proposed method of reaching the ultimate objective in transit development through the arbitrary exercise of state authority and the abrogation of the partial home rule now enjoyed by the city is fundamentally unsound. It might be successful in bringing temporary financial relief to the companies through an increase in fares, but it could not effect a permanent solution of the problem consistent with the public interest or with the Governor's own declared purposes.
>
> The logical first step toward a permanent solution based upon the public interest, which the Governor sets forth as his objective, is the enactment of the permissive municipal ownership bill applicable to all cities of the state and to all franchise utilities. This bill is now pending in the Legislature.
>
> The second logical step would be the appointment, under the enlarged powers of home rule granted by the municipal ownership bill, of a local commission to make a comprehensive study of the traction problem from the point of view of municipal interests, and to devise a plan for its solution. In lieu of this the Governor's program might be made acceptable to the people of New York City if the proposed transit commission's plan were made conditional upon its approval by the Board of Estimate and Apportionment or by the electors of New York City at a referendum.
>
> As it stands the Governor's commission plan invites local hostility where local co-operation is requisite to the success of any transit settlement that may be proposed. Without such co-operation the practical result of the legislation recommended by the Governor is pretty sure to be a surrender of public rights without compensating concessions from the companies; a deepening of the political antagonism which has poisoned the relations between the city and the State for the last hundred years; and a distinct weakening of the forces at work in New York City loyal alike in victory and in defeat to the ideals of efficient self-government.

Detroit Preparing to Buy More Equipment

Thorough surveys of proposed routes and equipment for the remaining 82 miles provided for by the A and B routes of the Detroit (Mich.) Municipal Railway have been ordered by the Board of Street Railway Commissioners.

The engineers have been directed to proceed with a view to beginning actual construction as soon as possible. It is planned to double the construction equipment now on hand and bids will soon be asked for steel rails, ties and special work. General construction will be undertaken in the spring, including the completion of the Charlevoix-Buchanan cross-town line, the Clairmont-Owen cross-town system and two north and south lines on the east side. These two are named as the next sections to be constructed.

Lawsuits are anticipated by the commission opposing the construction of some of the lines. If suits are started it is believed that the building of the line involved will be postponed and another started in its place.

The city proposes to build 82 miles of track this summer. It has already issued bids for ten steam shovels and will place orders through the city purchasing department for wire, rails and special work shortly.

Construction of a carhouse has been started on newly acquired property on St. Jean Avenue.

Separate Industrial and Rate Functions Proposed

In a special message to the Kansas Legislature Governor Allen has recommended taking public utilities from the jurisdiction of the Industrial Court, and creating a new commission to regulate them. A bill to that effect has been introduced, also containing a provision that in utility matters where labor is interested the judges of both courts shall sit *en banc*.

The effect of this would be that in most of the really important utility cases the two courts would join, but the Industrial Court would be relieved from a multitude of small utility matters. A short experience has demonstrated that these minor matters have hampered the efficiency of the Industrial Court, and the law has not had a full opportunity to prove its usefulness.

The Governor feels that the Industrial Court should not be hampered by other functions but should give all its attention to promote continuity of service in industry.

New Orleans Case Urged

General Agitation Begun to Secure Start Toward Basis for Permanent Settlement

George H. Terreberry, recently elected president of the Association of Commerce at New Orleans, La., in a recent address, said that the electric railway problem of New Orleans was one which needed to be settled at once and that he intended the chief work of his administration should be devoted to this end.

Mr. Terreberry was one of the special masters appointed by the judge of the federal district court to settle the strike among the platform men of the New Orleans Railway & Light Company and to reach some solution of the railway problem. He frankly admitted in a talk to the members of the Council, of which body he was chairman for two years, "that nature did not endow him with the talent required for solution of the problem."

From the study which he has made of the matter, however, Mr. Terreberry favors the service-at-cost plan as perhaps the most promising of the schemes advanced for consideration. Any attempt at reaching an understanding must be predicated on capital, labor and the public approaching one another in a spirit of fair play and forbearance. Unless this was done the result, he predicted, would be unavailing. It would mean an end to future investments in utilities in New Orleans.

Excerpts from Mr. Terreberry's address have been reproduced in advertisements in all the New Orleans newspapers in the hope of stilling what Mr. Terreberry calls "the clamor of the stupid and ignorant."

An editorial in the New Orleans *Daily States* of Jan. 26 demands a complete reorganization of the local company. That paper said in part:

> In any attempt to solve the city's transportation, fuel and power problem the thing that ought to be kept in mind is that nothing short of complete reorganization will answer. No makeshifts will meet the situation.
>
> One of the reasons why the company is so frequently compelled to change its operating head is that satisfactory service is out of the question under existing conditions. A superman probably could not render it.
>
> A. L. Kempster came here last year with a high reputation as an operating executive. Others with equally high reputations preceded him, men like Wyman, Pevear, Sloan, Bleecker and others who made successes elsewhere—at times, too, when the conditions were more favorable than they are now. But Mr. Kempster, even with his experience and energy, has not been able to achieve the impossible.
>
> The 8-cent fare ordinance is to be effective only until April. Unless a real move toward reorganization is made before then we shall face a worse condition than ever, for the public protest is sure to gain in volume against a continuance of this excessive fare unless a genuine reorganization is under way.
>
> Such a reorganization ought to contemplate a discharge of the receivership; local control; a valuation of the property which will make its success possible, not one so high as to make failure inevitable; and the investment of capital enough to put the equipment of cars and tracks in a condition to meet the public needs and enlarge the power plant, which has practically reached its capacity, to take care not only of the demands soon to be made on it, but such future demands as a growing city will develop, and to make possible the efficient and economical operation of both systems. All New Orleans asks is good service under reasonable charges.

"Journal of Electricity" Enlarges Its Scope

Enlargement of the editorial scope of the *Journal of Electricity* and a change in its name to *Journal of Electricity and Western Industry* were announced at a dinner on Feb. 1 in the Palace Hotel, San Francisco. The date marked the thirty-fifth anniversary of the *Journal of Electricity*, which has been one of the McGraw-Hill publications since September, 1919. Robert Sibley will continue as editor of the enlarged paper.

The *Journal of Electricity and Western Industry* will be devoted to the upbuilding of the West as an industrial section, and it will interpret Western progress through the application of electric power, light and heat in industries and homes. In its enlarged scope the publication will record the progress of the Far West not only of the electrical industry as such but also of all industry dependent upon electrical energy. The fullest editorial support will be given to financing the huge building programs of the Western electrical utilities in the development of hydro-electric power, as this is held to be the greatest single asset of the West.

Among the hundred guests were included prominent representatives of the utility, banking, irrigation, agricultural and manufacturing interests of the entire West.

News Notes

Franchise Rejected at Akron.—Following the amendments relative to the method of valuation and rate of return the City Council of Akron, Ohio, on Feb. 1 rejected the proposed franchise to the Northern Ohio Traction & Light Company looking toward a settlement of the local railway problem.

No Wage Reduction in Seattle. — The bill recently introduced in the City Council of Seattle, Wash., advocating a 15 per cent cut in the wages of all municipal employees including those of the Municipal Railway effective on March 15, has been killed in the Council by a vote of seven against and one in favor.

Want Service Restored. — The Mayors' Club of Massachusetts, composed of present and former executives of all the cities of the State, will probably ask for restoration of car service in the various communities that have lost this means of transportation. It is stated that consideration is being given to adopting a measure to call the matter to the attention of the Legislature and then to the Department of Public Utilities.

Wants Municipal Bus.—Provision for a city bus line to operate in addition to the electric railway has been proposed as an addition to the home rule charter voted at the last general election by the people of Minneapolis. The amendment is proposed by the Prospect Park Improvement Association alleging that railway service is insufficient. There is now a private bus line operating through Prospect Park between Minneapolis and St. Paul. The fare on this line is 25 cents against 12 cents on street cars.

Restraining Injunction Dismissed.—The Supreme Court of Tennessee has affirmed the decree of the Court of Civil Appeals in affirming the decision of the chancellor in dissolving the injunction and dismissing the case of the Nashville Railway & Light Company against John B. Lawson, labor organizer, against whom the Nashville Railway & Light Company secured a temporary injunction restraining him from organizing the employees of the railway company into a union in violation of their contract with the company.

Home Rule Again the Issue. — The City Council of Minneapolis, Minn., by a vote of eleven to ten opposes the Brooks-Coleman legislative bill planning to place the electric railways in the hands of the State Railroad & Warehouse Commission. By a vote of fourteen to eight the Council has appropriated $3,200 from the current expense fund to pay expenses of the city street railway inspection office. Several months ago the Council refused to do this. It then sought to abolish the office. A league of Minnesota cities which have electric railways was discussed at the third annual meeting of the Mayors on Feb. 7 and 8 in Minneapolis.

Ohio Opposes Coal-Carrying Roads.—Ohio is attracting attention at this time from railroad officials and state utilities commissions and boards because of the determined stand taken by the three members of the Ohio State Public Utilities Commission against the demands of coal-carrying roads traversing the State for the differential rates on coal in addition to the 40 per cent increase in rates granted some time ago. Added interest attaches to the case because of the action by the Interstate Commerce Commission in ruling that intrastate rates for freight and passenger service should enjoy the same increase as had been awarded the roads by the Interstate Commerce Commission on interstate rates.

Names Submitted for Neutral Arbitrator.—In the arbitration case involving the Detroit United Railway and its platform employees, and the question as to the company's right to open the wage reduction question prior to the expiration of the existing contract on May 1, John A. Russel, arbitrator for the railway, has submitted a list of sixteen names to Judge Edward J. Jeffries, the men's representative, with the understanding that the appointment of any of the men named would be agreeable as a third arbitrator. In his letter to Judge Jeffries Mr. Russel urged that the arbitration be arranged for and finished as soon as possible consistent with the deliberation due to the parties represented.

Programs of Meetings

Central Electric Railway Association

The Central Electric Railway Association will hold its annual meeting on Feb. 24 and 25 at the Secor Hotel, Toledo, Ohio. The program includes the annual address of the president, Robert I. Todd; an address by James P. Barnes, president of the Louisville Railway; a paper on the conservation and preservation of line poles, illustrated with a motion picture, by R. R. Cunningham, and a general discussion on "The Future of the Central Electric Railway Association." The meeting on Friday will be devoted to the subject "Traffic and How to Sell Transportation," led by a discussion by Bert Weedon, traffic manager Interstate Public Service Company, Indianapolis, Ind., followed by a paper, "A Freight Traffic Manager's View," by C. O. Sullivan, traffic manager Western Ohio Railway, Lima, Ohio, and a paper, "An Operating View," by L. M. Brown, superintendent of the Interstate Public Service Company, Indianapolis, Ind. This will be followed by a general discussion by the members. The annual report of the secretary-treasurer will be presented and officers for the ensuing year will be elected and installed. A special car will be run from Indianapolis to Toledo. Railway and supply men are invited to join the party.

American Institute of Electrical Engineers

The ninth annual midwinter convention of the American Institute of Electrical Engineers will be held Feb. 16-18, 1921, in the Engineering Societies Building, New York.

The Wednesday evening session will be opened by an address by President A. W. Berresford, followed by the presentation of papers by H. R. Woodrow and Philip Torchio under the auspices of the protective devices committee.

On Thursday morning six papers will be presented, by W. A. Del Mar, Philip Torchio, D. W. Roper, W. S. Clark, H. W. Fisher and L. L. Elden. This session will be under the auspices of the subcommittee on wires and cables of the standards committee.

On Thursday afternoon the telegraphy and telephony committee has arranged for the presentation of two papers.

Friday morning will be occupied by a session arranged by the instruments and measurements committee.

Friday afternoon there will be a session with three papers, by R. E. Doherty and E. T. Williamson, W. Fondiller and W. H. Martin, and Carl J. Fechheimer.

Friday evening will witness the presentation of the Edison Medal to Dr. M. I. Pupin "for his work in mathematical physics and its application to the electrical transmission of intelligence.

Financial and Corporate

Gain Is Negative

Increase in Expenses in New York City Greater Than Increase in Operating Revenue

According to the report of the revenues and expenses of the surface and rapid transit electric railway lines operating in New York City as issued by the Public Service Commission for the First District for the quarter, January to March, 1920, the passenger revenue increased $3,158,000, or 12.2 per cent, over the corresponding 1919 quarter. At the same time the operating expenses increased by $4,152,756, or 21.1 per cent. This made the total expenses $23,870,067 as compared with a total revenue of $31,366,186. The operating ratio was 76.1 per cent. The gross income decreased over 1919 by about 5 per cent. After subtracting interest, rentals, etc., which increased about $890,000, the net corporate income was $1,247,626 short of the 1919 figure.

Although there was a decrease of more than 5,000,000 revenue car miles the total passengers carried increased by more than 18,000,000 persons. Due to the fact that transfers were either not issued or there was a charge of 2 cents for them the total revenue passengers increased by 65,000,000 while the free transfer passengers decreased by nearly 47,000,000. The balancing of these allowed the gain in passengers, as has been mentioned, to be only 3.1 per cent, making a total in 1920 of 609,826,677 persons.

EARNINGS OF NEW YORK CITY COMPANIES

Quarter January-March	1920	1919	Percentage Change Over 1919
Passenger revenue	$29,091,623	$25,933,551	12.2
Other transportation revenue	229,638	159,393	44.1
Total revenue from transportation	$29,321,261	$26,092,944	12.4
Other railway operating revenue	2,044,925	1,620,573	26.2
Total railway operating revenue	$31,366,186	$27,713,517	13.5
Operating expenses:			
Maintenance expended	$6,767,938	$5,514,038	22.8
Depreciation reserve (credit)	197,982	825,404	—76.0
Operation of power plant	4,429,945	3,904,057	13.5
Operation of cars	10,876,403	9,136,684	19.0
Injuries and damages	875,952	1,108,689	—21.0
Traffic and general expenses	1,117,811	879,247	27.1
Total operating expenses	$23,870,067	$19,717,311	21.1
Net operating income	$7,496,119	$7,996,206	— 6.3
Street railway taxes	1,800,201	1,801,912	— 0.01
Operating income	$5,695,918	$6,194,294	— 8.0
Non-operating income	1,192,199	1,050,843	13.5
Gross income	$6,888,117	$7,245,137	— 4.9
Deductions from gross income:			
Interest	$5,650,763	$4,665,997	21.1
Rents	3,671,864	3,998,565	— 8.2
Miscellaneous	686,847	454,306	51.2
Total deductions from gross income	$10,009,474	$9,118,868	9.8
Net corporate income	* $3,121,357	* $1,873,731	61.7

*Deficit.

TRAFFIC AND MISCELLANEOUS STATISTICS OF NEW YORK CITY COMPANIES

Quarter January-March	1920	1919	Percentage Change
Miles of track, exclusive of storage and yard tracks	1,790.62	....	......
Average daily maximum number cars operated (March)	8,293	....	......
Passenger car-miles (active)	80,038,295	....	......
Car-seat miles	4,037,687,843	....	......
Total revenue car-miles	81,879,614	87,365,307	— 6.3
Passenger car-hours	6,810,366	....	......
Ratio C.M. to C.H. (speed m.p.h.)	11.75	....	......
Revenue passengers	580,238,542	522,193,413	11.1
Revenue transfer passengers	7,394,059	....	......
Total revenue passengers	587,632,601	522,193,413	12.5
Free transfer passengers	22,194,076	69,082,333	—67.8
Total all passengers	609,826,677	591,275,746	3.1
Operating ratio (per cent)	76.10	71.06	5.04
Statistics per car-mile:			
Operating revenue (cents)	38.31	31.70	20.8
Operating expenses (cents)	29.14	22.58	29.0
Net income (cents)	*3.81	*2.15	77.2
Number of passengers (total)	7.45	6.77	10.0
Car-miles per revenue passenger	0.140	0.167	— 1.6
Current generated (kw.-hrs.)	356,304,081	337,920,692	5.4

Municipal Road May Be Abandoned

It is reported that the city authorities may discontinue service on the municipally-owned Norton, Taunton & Attleboro Street Railway, Taunton, Mass. Attempt has been made to assess $15,000, or half the purchase price, on the abutting property owners, but the abutters are planning to fight the assessment in the courts. The road is said to be operating at a loss of about $1,000 per month.

Indiana Merger Voted

$3,000,000 in Property to Be Taken Over by Interstate Public Service Company

Stockholders of the Louisville & Southern Indiana Traction Company, the Louisville & Northern Railway & Lighting Company, the Central Indiana Lighting Company, the Bloomington Light & Gas Company, and the Interstate Public Service Company, Indianapolis, met in Indianapolis recently to ratify contracts signed by directors of the various companies for the consummation of negotiations amounting to more than $3,000,000 in property to be taken over by the Interstate Public Service Company according to Ira E. Guthrie, secretary-treasurer of the last named company.

The property of the Louisville & Southern Indiana Traction Company, which consists principally of the interurban line between New Albany and Louisville by way of Jeffersonville, also the local railway systems in New Albany and Jeffersonville, together with the property of the Louisville & Northern Railway & Lighting Company, will be purchased by the Interstate Company for $2,000,000.

The other deals were the acquisition by the Interstate Public Service Company of the property of the Central Indiana Lighting Company, Columbus, Ind., which owns both the light plant and the railway lines in Columbus, and also the light and gas plants in Bloomington, Ind. More than $1,000,000 will be paid by the Interstate Public Service Company for the properties of the Columbus and Bloomington companies.

Service Discontinued at Rockport

The announced purpose of the officials of the Evansville & Ohio Valley Railway to stop running cars on Main Street east of Fifth Street at Rockport, Ind., was put into effect a few days ago. At a meeting of the City Council and representatives of the company with Rockport citizens interested in having the cars continue the run, a determination to refer the matter to the Indiana Public Service Commission was reached. The Council has also received its former order authorizing or petitioning the Public Service Commission to allow this part of the railroad to be removed.

The railway has given the city a bond in the sum of $1,200 to cover the expense of putting the street into good condition after the removal of the track, should the company fail to repair the street. For the present the track remains in the street but the company will not operate cars unless ordered by the Public Service Commission to do so.

Eastern Massachusetts Outlook Better

Platform Labor Costs Have Been Reduced and Many Other Operating Economies Worked—Reduction in Fare Unlikely

The public trustees of the Eastern Massachusetts Street Railway, Boston, Mass., have presented their report for the first eighteen months of public control, ended Nov. 30, 1920. The financial results have been unsatisfactory. The future, however, looks encouraging. Jitney competition, high cost of maintenance, enormous winter loss, increased cost of coal, increased wages and finally a serious business depression have been encountered successively. Even with improved operating efficiency and extreme economy, say the trustees, satisfactory earnings cannot be expected during the present business depression. When business revives, as the trustees believe it must before long, the earnings are expected to improve substantially.

FOR the year ended May 30, 1920, and the six months ended Nov. 30, 1920, earnings and expenses were as follows:

	Twelve Months Ended May 31, 1920	Six Months Ended Nov. 30, 1920
Total revenue and income	$13,471,220	$6,863,861
Expenses:		
Way and structures	$2,106,670	$1,063,108
Equipment	2,008,767	848,369
Power	1,909,722	1,168,413
Conducting transportation	5,230,889	2,295,918
Traffic	17,144	13,906
Injuries and damages	276,569	184,650
Insurance	155,735	71,192
Stores and stable expenses	115,040	80,673
Rent, tracks and equipment	113,313	54,430
Clerical salaries and expenses	256,262	108,495
General and miscellaneous	196,328	119,567
Operating expenses	$12,386,439	$6,008,721
Taxes	323,333	103,394
Operating expenses (including depreciation) and taxes	*$12,709,772	$6,112,115
Gross income	$761,447	$751,745
Interest and rentals	1,484,518	796,904
Interest and rentals not earned by	$723,071	$45,159
Additional amount necessary to meet cost of service	†1,164,747	499,489
Cost of service not earned by	$1,887,818	$544,648

* Includes $750,000 extraordinary snow expense.

Depreciation charges included in operating expenses amounted to $976,862 in the twelve months' period and $574,863 in the six months' period.

† Cost of services includes 6 per cent on valuation established by Public Service Commission of the property operated.

At the outset of public control, the trustees agreed that the railway, in order to regain public confidence, must be put in closer touch with the people. With this end in view, local managers were given increased authority and responsibilities, and committees of citizens were appointed in the various districts, either by the Mayors or Chambers of Commerce, with the power of supervising service and to make recommendations for any improvements which they believed would result in better relations between the car riders and the company.

Control by committees of local citizens has worked out very satisfactorily. These committees give their time and thought to the study of local service problems, without compensation, and through their wide acquaintance and standing in their own communities have been of great assistance in solving numerous traffic problems and creating an atmosphere of mutual understanding between communities and the company, the absence of which in the past caused considerable friction. The trustees, in the light of their experience, are now more than ever convinced that the railway can be much more successfully operated when thus treated than under a long distance control plan when sole authority is vested in Boston executives.

The public control act permits the trustees to charge in each district fares sufficient to earn the cost of service. The cities served are of moderate size, and the experience of the company has proved that every increase in city fares somewhat reduces the number of short-haul riders. Therefore, special rates of fare for daily riders proved desirable. It also has been clearly demonstrated that traffic density and operating costs so vary in different districts that uniform fares are impracticable. The cash fare is 10 cents, but reduced price punch card tickets are sold at rates varying from 6¼ to 8⅓ cents a ride. In Fall River, monthly commutation tickets are also sold at the rate of 6 cents a ride. The use of reduced rate tickets is so general that the average city fare on the system is approximately 8 cents.

When the trustees entered upon their duties there were nearly 1,000 licensed and unlicensed jitneys over-running the territory. The trustees immediately became convinced that the railway and jitneys could not continue to operate in the same community, and the cities and towns affected were persuaded that they could not support both. Until June, 1920, earnings were very seriously reduced by this competition. At the present time there are practically no competing jitneys.

For several years, it was evident that the Bay State System, the predecessor to the Eastern Massachusetts Street Railway, included many miles of road which never should have been built, and other lines which changed conditions and the competition of private automobiles have since made unprofitable. The receiver discontinued 34 miles. The trustees have discontinued 123 miles, leaving 681 miles of single track in operation. The future of the discontinued mileage is uncertain. If the State and the communities served do not consider continued operation of sufficient necessity to warrant public support, the plan is to take up the rails.

Cities and towns are permitted by law to contribute by taxation to avoid discontinuance of railway lines. During 1920, Hingham and Hull agreed to contribute $15,000; Weymouth, $28,000; Tyngsboro, $1,800; North Reading, $2,500; Milton, $10,000, and Norwood and Walpole, $6,000. Gloucester refused to contribute, and since the operation of the Gloucester Division resulted in a loss of $74,000 during the last year, the trustees discontinued service on June 20, 1920.

ONE-MAN CARS PREDOMINATE

In September, 1919, the trustees ordered 200 one-man cars. Delivery was delayed by the severe winter until April, 1920. The cars have been successful from the first. The company now owns 250 of the latest light weight type of one-man cars, which have cost $1,500,000. In addition to these 250 light weight cars the company is operating 280 one-man double truck cars. In December, 1920, 76 per cent of the total car miles operated was by one-man cars. But for the introduction of one-man cars, say the trustees, there is no doubt that a large part of this system, including many city lines, could not earn bare operating expenses and would have to be discontinued.

When the trustees took control in June, 1919, conductors and motormen were being paid 41, 43 and 45 cents an hour. In August, 1919, the War Labor Board increased this rate to 46, 49 and 51 cents, retroactive to June 1, 1919. In Septmber, 1920, a board of arbitration awarded a further increase to 62 and 67 cents, and $400,000 back pay. On the basis of the number of men employed in June, 1919, the increases in wages during trustee control have been at the rate of $1,900,000 a year. Only by one-man cars and a large reduction in miscellaneous employees has this increase been partially offset.

The trustees point out that as costs of other commodities decline car riders naturally will expect to pay reduced car fares, but that as labor cost is by far the largest expense in the operation of an electric railway substantially lower fares will be impossible while wages continue on a war-time basis.

Next to labor costs, the trustees point out, the largest source of expense is coal. In 1920 141,714 tons were consumed on the Bay State System. The average cost of coal delivered in 1915 was $3.25 per ton. The average cost of coal delivered in 1920 was $13.40 per ton. Since April, 1920, the cost of coal has increased at the rate of $700,000 a year. Indications are that there will be a substantial reduction during 1921 in the price of coal at the mine, but coal freight charges today are about $5.80 per ton, or 75 per cent more than the entire cost per ton delivered in 1915.

FREIGHT SERVICE ABANDONED

In May, 1920, it was decided to abandon the freight business. High and increasing cost of rent of terminals, increased wages, motor truck competition, and damage to roadbed by the heavy freight equipment made the business unprofitable. All freight equipment was disposed of to advantage or converted into snow sweepers and snow plows.

The total expenditures for track repair and rehabilitation for the twelve months ended Dec. 31, 1920, were $1,600,000. A summary of the track work done in 1919 and 1920 follows:

	1919	1920
Track constructed with new rail,	28,900	57,000
Track rebuilt with old rail, ft......	34,600	98,100
Ties replaced....................	98,273	105,252
Joints welded	856	15,226

With high priced coal, high priced labor, and high priced material, operating economies and lower costs have been difficult to obtain. Only through greater efficiency have savings been possible. The use of one-man cars has reduced platform labor from 15 cents to 10½ cents per car mile. Building and office rents paid have been reduced 70 per cent. Thirteen carhouses have been closed. The Boston organization has been reduced from 245 to 75 employees. On Jan. 1, 1921, the total number of employees was 2,557, compared with 4,836 in January, 1920.

The reorganization plan provided $500,000 as an operating reserve fund, $1,000,000 for rehabilitation, and $2,000,000 for new construction and equipment. The reserve fund was exhausted by the extraordinary 1920 winter expense, and $325,000 of the rehabilitation fund has been expended on track and equipment. The $2,000,000 improvement fund has been entirely expended, $1,500,000 for one-man cars and the balance for snow fighting equipment, track construction, shop alterations and miscellaneous new work.

The physical condition of the entire property has been substantially improved. Probably two more years will be required to bring it up to a high standard.

In accordance with the directions contained in the public control act the trustees, after hearings and conferences with representatives of various communities, created the following operating districts: Lowell, Lawrence, Haverhill, Gloucester, Salem, Lynn, Chelsea, Melrose-Woburn, Hyde Park, Norwood, Quincy, Hingham-Hull, Weymouth, Brockton, Taunton and Fall River.

Each district is operated as if it were a separate railway. Earnings and expenses are accounted for separately and fares are regulated according to the cost of service in each district.

Toledo Lines Segregated

Railway and Lighting and Gas Properties Separated Under New Arrangement at Toledo

The Toledo Railways & Light Company, Toledo, Ohio, at the stroke of 12 o'clock on Jan. 31 ceased to operate the street railways of Toledo and from that time on the railway lines have been operated by the Community Traction Company at a 6-cent fare with a 1-cent charge for transfers.

CAPITALIZATION APPROVED

All arrangements necessary for the new company had been completed with the Secretary of State of Ohio and the Ohio Public Utilities Commission. The handing over of the property to the new company has been approved, together with the capitalization of $10,000,000 of common stock, $2,000,000 of 8 per cent preferred stock, and $8,000,000 of 6 per cent first mortgage bonds.

The common stock of the new company will be deposited with the sinking fund commissioners of the city, and when all the bonds are retired the common stock will become the property of the city, representing the equity of the city in the railway properties, the $8,000,000 in bonds representing the payment by the Community Traction Company for the city electric railway property.

OFFICERS RE-ELECTED

At the annual meeting of the Toledo Railways & Light Company held on Jan. 29 all retiring officers and directors were re-elected. The stockholders voted to accept the service-at-cost franchise ordinance and approved the transfer of the railway properties of the Toledo Railways & Light Company to the Community Traction Company, the new corporation created by the ordinance.

The only railways which the Toledo Railways & Light Company now operates are the Adrian Street Railway and the Toledo, Ottawa Beach & Northern Railway, a summer resort line owning no rolling stock. It will, however, control and continue to operate the power, lighting and heating plants in Toledo.

Frank R. Coates is president and general manager; F. J. Derge, assistant general manager; Henry T. Ledbetter, secretary; A. C. Van Driesen, assistant treasurer; and T. A. Wallace, assistant secretary.

The negotiations between the city and the company which have resulted in the arrangement now in effect have been reviewed from week to week in the ELECTRIC RAILWAY JOURNAL since their inception.

$1,326,072 Net Income for Capital Traction Company

The Capital Traction Company, Washington, D. C., has submitted its annual report for the year just ended. Large increases are shown in its net operating revenue, operating income, gross income and net income. After deducting $305,655 for interest on funded debt, rent for leased road and other miscellaneous debits the company shows a net income of $1,326,072. This was an increase of $212,579 over the same period a year ago. In its profit and loss statement the company shows a credit balance of $693,543, which is an increase of $196,000 over the credit balance of 1919.

SUMMARY OF OPERATIONS OF THE CAPITAL TRACTION COMPANY FOR YEAR ENDED DEC. 31, 1920

		1919	Increase Over 1919
Passenger revenue........		$5,435,939	$919,754
Special car revenue........		23	51*
Mail revenue........		....	170*
Total revenue from transportation........		$5,435,962	$919,533
Revenue from operation other than transportation........		30,555	11,324
Railway operating revenue........		$5,466,517	$930,857
Operating expense (60.30 per cent of gross revenue)........		3,302,061	470,902
Net operating revenue........		$2,164,456	$459,955
Taxes assignable to railway operations........		541,727	228,393
Operating income........		$1,622,729	$231,562
Non-operating income........		8,999	3,942*
Gross income........		$1,631,728	$227,620
Deductions from Gross Income:			
Interest on funded debt........	$280,300		
Interest on unfunded debt........	10,716		
License trackage space........	1,200		
Rent for leased road........	9,533		
Miscellaneous debits........	3,905		
Total deductions........		305,655	15,039
Net income........		$1,326,073	$212,581

* Decrease.

PROFIT AND LOSS STATEMENT

Credit:			
Balance beginning of year........	$497,355		
Net income for year........	1,326,072		
		1,823,427	
Debits:			
Dividends........	$720,000		
Loss on real estate sold and equipment retired........	409,660		
Loss on material sold........	71		
Uncollectible accounts written off........	152	1,129,883	
Credit balance at close of year........		$693,544	$196,188

Replacement Value Expected to Guide New Body

In commenting on the prospect of a valuation of the transit lines in New York under the program of Governor Miller the *Wall Street Journal* of Feb. 8 said in part:

> It is evident that the replacement value of Interborough's properties is now far in excess of its outstanding securities, whatever watering may have accompanied their issuance.
>
> Precedent for a revaluation of the rapid transit lines on a basis of reproduction cost has been set by a decision of a Missouri federal court in the case of St. Joseph Railway, Light, Heat & Power Company. This ruling, which is expected to guide the commission Governor Miller proposes to appoint for an investigation of the local fare problem, declared that it was confiscatory to determine traction rates on a valuation based on the original cost. "No one can say what degree of depression may ultimately come," the decree read, "but it is reasonably certain that the cost of the properties now under consideration will never again approximate figures prevailing in the years before the world war."
>
> It is just as certain that a fair appraisal of the present cost of replacing Interborough's investment would greatly exceed the amount of securities outstanding, some authorities placing the increase that would be shown over the original cost so high as 100 per cent. Taken in this light continuation of a fare which does not even yield fixed charges on Interborough's pre-war investment can only be considered, in the words of the court, as "inadequate and practically confiscatory."

The decision in the so-called St. Joseph case was referred to at length in the ELECTRIC RAILWAY JOURNAL for Nov. 27, page 1122.

Interurban Purchase Suggested

Purchase of the interurban line of the Columbus, New Albany & Johnstown Traction Company is contemplated by the Columbus Railway, Power & Light Company, of Columbus, Ohio, as one probable quick solution of the demand of the city that service be extended to the suburb of Shepard. If the company succeeds in buying the Columbus, New Albany & Johnstown line, it will be able to make plans immediately for the extension. To date the matter is still one of conjecture, with progress suspended, so far as the city is concerned. Further conferences are, however, being arranged.

The Columbus Railway, Power & Light Company, announced its willingness last summer to take advantge of an opportunity afforded at that time to purchase certain interurban lines, but the interurban companies opposed the proposal, and the matter was dropped.

Pratt Street Station, Baltimore, Sold by Railway

A contract has been entered into between the United Railways & Electric Company, Baltimore, Md., and the Consolidated Gas, Electric Light & Power Company of the same city by which the Pratt Street power station of the former company is sold to the latter company, which hereafter will supply the power for the operation of the cars of the United Railways & Electric Company. The price at which the power station is said to have changed hands is $4,000,000.

It is expected that owing to the diversity factor the lighting and power company can supply energy in the future to the railway at less than the latter could generate it. In fact, the contract provides that the cost will be no more than that now paid to the lighting company for current taken in the past and of any saving made one-third will be paid to the railway.

The power contract is for five years but is automatically renewable. Another clause provides that at any time, if the contract or any part of it results in serious injustice to any of the parties thereto and an equitable distribution of the benefit is not obtained, the terms may be readjusted by arbitration.

71,768,440 Revenue Passengers in St. Louis in Three Months

The United Railways, St. Louis, Mo., has filed its quarterly report with the City Register of St. Louis, covering the final quarter of the year 1920. The report gives the average number of cars run daily and Sunday, the total number of revenue passengers of all descriptions and the average number of trips made daily and Sunday. The report is as follows:

Trips	1,614,616
Miles	10,510,026
Fare Passengers Carried	
3,974	7½ cent
70,133,210	7 cent
1.102	3½ cent
1,629,300	3 cent
854	2½ cent
71,768,400	

The average number of cars operated was as follows:

Average per weekday	1,321.5
Average per Saturday	1,224.9
Average per Sunday	699.0
Final average	1,207.0

The average number of trips made per week was as follows:

Weekdays	85,897
Saturdays	14,699
Sundays	10,486
Total	111,082

Brooklyn Receiver Reports

Lindley M. Garrison, receiver of the Brooklyn (N. Y.) Rapid Transit Company, filed with Judge Mayer of the District Court of the United States for the Southern District of New York on Feb. 8 a report of 120 pages on the affairs of the various companies involved in the receivership and sought instructions with respect to the report.

In general the receiver says that the transportation problem in Brooklyn should be treated as a whole, but that under existing conditions there is no centralizing authority capable of treating the situation as an entity. While it is not suggested that the court can deal adequately with the question presented to it, it is nevertheless important in the opinion of the receiver for the court to consider the necessities of the situation as a whole with a view to meeting them as fully as the existing law permits.

Financial News Notes

Two New Directors at Detroit.—C. R. Nutt, Cleveland, Ohio, and Charles Laurondau, Montreal, Que., have been elected directors of the Detroit (Mich.) United Railways, succeeding B. M. Swift and Alonzo Potter.

Merger Bill Reported Favorably.—While a bill has been reported favorably to the House of Representatives taking the initial step toward consolidating the Washington Railway & Electric Company and the Capital Traction Company in Washington, there is said to be little chance that action will be taken before Congress adjourns on March 4.

Time for Deposits Extended.—The protective committee, representing the holders of the first mortgage 5 per cent bonds of the Columbus, Buckeye Lake & Newark Traction Company, Newark, Ohio, due in 1921, has announced that the time for the deposit of the bonds under the protective agreement of Nov. 10, 1920, has been extended to April 1, 1921.

Notes of Baltimore Company Offered.—A syndicate of bankers headed by Alexander Brown & Sons, Baltimore, Md., offered for subscription on Jan. 17 an issue of $1,500,000 of 7½ per cent five-year collateral trust notes of the United Railways & Electric Company, Baltimore, Md. The proceeds of the notes were used in part to pay off notes which matured on Feb. 1.

Receivership Made Permanent.—The temporary receivership under which the Alton, Granite City & St. Louis Traction Company, East St. Louis, Ill., has been operating for the last four months, has been made permanent by Federal Judge English at East St. Louis. The appointment of W. H. Sawyer and Frederick Allen as temporary receivers and C. B. Thomas as their counsel has also been made permanent.

Interest Paid Promptly.—The City & Suburban Railway, Washington, D. C., deposited with the Baltimore Trust Company, trustee, funds to meet the semi-annual interest due on Feb. 1, on the $1,750,000 of first mortgage 5 per cent bonds. At the last two interest paying periods on these bonds the company took advantage of its ninety-day clause in the mortgage before meeting payment on the securities.

Court Authorizes Abandonment.—Supreme Court Justice Morschauser has directed Receiver Miller, of the Westchester Street Railway, Mount Vernon, N. Y., to abandon operations on the mile and a half Shore line route from Mamaroneck to Larchmont as the receiver has reported that the company was losing $35 to $40 a day on that line. The action was taken in the face of an order of the Public Service Commission for the Second District of New York directing Receiver Miller to run the road.

Foreign Corporations to Be Prohibited.—Harold A. Moise, elected delegate to the Constitutional Convention, from New Orleans, La., to meet in Baton Rouge early in March for the purpose of revising the organic laws of the State, gives notice that he purposes to introduce a measure requiring all companies operating public utilities to incorporate under the law of the State and making it prohibitive for foreign companies to own or operate public utilities or in any way exercise control over them. The proposed new law is directed primarily at the New Orleans Railway & Light Company and affiliated companies, but its effect necessarily will be statewide.

Notes of Oklahoma Railway Offered.—The Mississippi Valley Trust Company, St. Louis, Mo., is offering at 98 and interest to yield 8.35 per cent $450,000 of bond-secured 8 per cent gold notes of the Oklahoma (Okla.) Railway. The notes are dated Jan. 1, 1921, and are due Jan. 1, 1928. The notes are secured by the deposit of $680,000 of first and refunding mortgage 5 per cent bonds, $120,000 of Guthrie Railway first mortgage 5 per cent bonds and $500,000 of Guthrie-Edmond Electric Railway first mortgage 5 per cent bonds. They are convertible into first and refunding mortgage bonds at the rate of 80 or $5,000 of bonds for $4,000 of notes.

$600,000 Due for Taxes.—The illness of City Attorney Kittredge has delayed the preparation of the intervention to the receivership in the Federal Court which the city intends to file against the New Orleans Railway & Light Company for the collection of approximately $600,000 due for the 1920 taxes now delinquent. There is a penalty of 10 per cent attached to the delay in making the payments for which the company will be held accountable. The receiver has offered to pay its indebtedness to the city in three payments, declaring that it is without funds to discharge itself of the debt in one lump sum. This privilege has been denied on the grounds that the company stands in the same light as any other taxpayer.

Interborough Accounts Questioned.—Transit Construction Commissioner Delaney has filed objections to reports of the Interborough Rapid Transit Company, New York, containing extraordinary charges for promotion of higher fares, for publicity generally for strike and financial investigations and for legal advice, said to have been improperly reported in operating expenses, amounting in all to $423,000. Frank Hedley, president of the company, has explained that the contract between the city and the company provides a method of adjudication by arbitration of all disputed items, and that in due course the items in question will be considered by orderly process.

Operating Lease Made at Dallas.—Contracts for lease and operation of the Standard Traction Company's Mount-Auburn-Parkview lines in the city of Dallas, Tex., by the Dallas Railway and for the construction of a passing switch on Beacon Street have been approved by the City Commission of Dallas. The Dallas Railway will have free use of the lines of the Standard, will receive all fares collected and will bear the cost of the passing switch. Through service will be maintained from the down-town section to the ends of the lines, and it will be no longer necessary to maintain transfer points in the city's suburbs as has been the case.

Readjustment of Capital Proposed.—The Kansas City, Clay County & St. Joseph Railway, St. Joseph, Mo., has filed with the Public Service Commission of Missouri a request for authority to issue $6,000,000 of 7 per cent cumulative preferred stock and $4,000,000 of common stock. In October the company obtained authority from the commission to reissue its capital stock of $10,000,000, of which $3,000,000 was to be preferred and $7,000,000 common. It sought to amend the articles of incorporation later, but the Secretary of State would not permit it to do so because all of the holders of the preferred stock had not given their consent. The company proposes to dissolve as a Maine corporation.

$300,000 of Notes for Improvements.—The issuance of $300,000 in notes for the purpose of purchasing equipment and rolling stock and making other improvements has been authorized by the board of directors of the Utah-Idaho Central Railroad, operating an electric line between Ogden, Utah, and Preston, Idaho. The greater part of the money will be used in the purchase of freight cars for the purpose of taking care of increase in the livestock and sugar beet business of the towns along the line of the road. The expenditure for the improvements will be made at once by the company. In fact, 100 new steel gondola cars have been purchased from a car manufacturer at Columbus, Ohio, and will be delivered to the electric line within the next two months.

Ancient of Days.—Three memberships in the Merchants' Exchange of St. Louis, acquired by independent street railway lines to permit their representatives to buy feed on exchange for the horses and mules that used to pull the cars, have been retained by the United Railways since the merger of the independent lines in 1900. The memberships cost $100 a year, so that the United Railways has paid $6,000 in twenty years without any beneficial return, a fact which Receiver Wells noted in an application to the Federal court for authority to sell the memberships. Their usefulness long since has passed away, according to Mr. Wells, who states that he believes he can obtain $1,000 each for the memberships. An order for their sale was immediately issued by Judge Faris.

Extension of Time for Discontinuance.—Justice Charles H. Brown, in the Supreme Court of Erie County, has granted an order extending until March 31 the time within which George Bullock, as receiver for the Buffalo & Lake Erie Traction Company, Buffalo, may discontinue operations of the road along the lake shore between Buffalo and the Pennsylvania state line, except that part of the line formerly owned by the Hamburg Railway, Buffalo. The original date for discontinuing service was Jan. 31. The application for an extension of time was made by the receiver, who informed the court he wished to determine the extent the revenue of the company would be increased by reason of the recent advance in the rates of fare between points on the interurban line. It is within the power of the receiver to discontinue service on March 31 and negotiate for a purchaser of the property before that time.

Wants Valuation Law Amended.—In accordance with resolutions adopted by the League of Municipalities at its annual convention Ledley H. Phinney, executive secretary, has sent letters to all members of the Senate, urging support for Senator Parry's bill, No. 13, amending the act of last year relative to the appraisal of electric railway property in the State of New Jersey and also urging that some steps be taken to break the present deadlock over the confirmation of public utilities commissioners. The Parry bill is now before the corporations committee. The valuation law provides that the report of the engineers must be submitted by March 1, but it is understood that the firm of Ford, Bacon & Davis, which is doing the work, has nearly completed the valuation of the Public Service Railway and will be able to turn over the figures to the Valuation Commission at an earlier date than that required by the law.

Stock Sold to Provide for Improvement.—The Public Service Company, San Antonio, Tex., has announced plans for the issuance of additional stock in accordance with an amendment to its charter filed in the office of the Secretary of State at Austin providing for the creation of $2,000,000 of preferred stock and by raising the amount of common stock from $4,700,000 to $5,000,000. W. B. Tuttle, vice-president and general manager, announced that $100,000 of the issue of common stock had been subscribed before the amendment was filed, leaving only $200,000 additional common stock to be sold. The proceeds from the stock, both preferred and common, will be used to keep pace with the growth of the city. Heretofore money needed for improvements and betterments has been raised by the issuance of bonds paying an annual interest rate of 5 per cent. This year it was deemed advisable to issue additional stock and to enroll among the stockholders of the company as many citizens of San Antonio as was found possible.

Traffic and Transportation

Main Street—Paterson

Complete Rerouting of Jitneys and Trolley Cars Suggested—Every Phase of Traffic Covered

The city of Paterson, N. J., has just received from John A. Beeler, consulting engineer, New York, an exhaustive study of traffic conditions in that city together with suggested remedies for betterment of the existing congestion. The report is in two sections, the first deals with the problem from the viewpoint of municipal regulation of vehicular traffic other than the trolley car, and the second takes up the contribution of the trolley cars to traffic congestion and the remedies that are suggested for the consideration of the Public Service Railway.

In dealing with the jitney bus topic, Mr. Beeler suggests that all jitneys be eliminated from the main streets by establishing terminal loops.

In handling the trolley situation, Mr. Beeler suggests the elimination entirely of the loop lines and the making of through lines of the strictly local car routes. He would make the interurban lines express lines with stops after leaving the center of the city, at intervals averaging about 1,200 ft.

Altogether the changes suggested are voluminous, so far as the rerouting of the trolley cars is concerned, but are of a nature not likely to meet with insurmountable objections. It may be said that the remedies proposed by Mr. Beeler are rather drastic, but then the problem is a difficult one, and its solution depends upon getting as much traffic as possible out of Main Street, a very narrow thoroughfare. To remove the trolley cars from Main Street would mean great expense in laying new tracks, repaving streets, and perhaps cutting through new thoroughfares, and, after all, the trolleys were there first. Mr. Beeler sums up the Paterson situation in the following paragraphs:

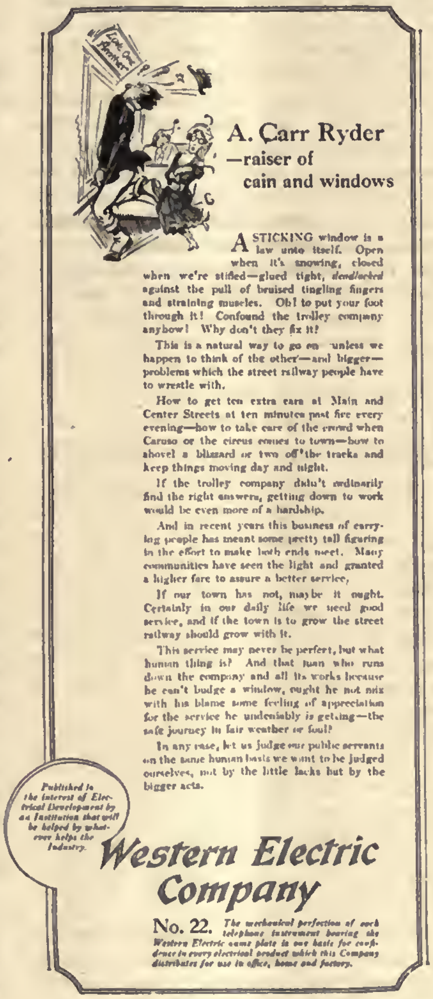
> The traffic difficulties are due to a number of causes. Chief among these are the physical layout of the city and its narrow streets, the street car routing, also fare collection, location of street car stops, the tremendous growth of automobiles, jitney and truck traffic, and vehicle.
>
> The fact that vehicular traffic centers on Main Street has made this the focus of the congestion.

Rerouting Plans in New Orleans

A tentative plan for the rerouting and relooping of cars in the business section of New Orleans, La., has been announced by Stanely Ray, commissioner of public safety. The system which has been gone over very carefully by Public Utilities Commissioner Maloney has the sanction of the New Orleans Railway & Light Company. The proposed scheme, which will eliminate congestion and so reduce delays, will affect about seventeen lines, changing sixteen and eliminating one. Certain business district streets running parallel with the river will be designated as one-way streets.

Judge by the Acts, Not the Lacks

The accompanying illustration was published by the Western Electric Company in a recent issue of the *Literary Digest* and will appear in the February 26 number of *Collier's*. In the interest of electrical achievement the Western Electric Company carried on a similar advertising campaign last year. The advertisement shows the attitude of the average car rider when a detail in service falls below the 100 per cent mark. The electric railways, after all, are only a human agency. The idea behind the ad is that the 2,350,000 subscribers to the *Literary Digest* and to *Collier's* will learn the lesson contained herein and "judge public servants not by the little lacks but by the bigger acts."



A. Carr Ryder
—raiser of
cain and windows

A STICKING window is a law unto itself. Open when it's snowing, closed when we're stifled—glued tight, *deadlocked* against the pull of bruised tingling fingers and straining muscles. Oh! to put your foot through it! Confound the trolley company anyhow! Why don't they fix it!

This is a natural way to go on—unless we happen to think of the other—and bigger—problems which the street railway people have to wrestle with.

How to get ten extra cars at Main and Center Streets at ten minutes past five every evening—how to take care of the crowd when Caruso or the circus comes to town—how to shovel a blizzard or two off the tracks and keep things moving day and night.

If the trolley company didn't ordinarily find the right answers, getting down to work would be even more of a hardship.

And in recent years this business of carrying people has meant some pretty tall figuring in the effort to make both ends meet. Many communities have seen the light and granted a higher fare to assure a better service.

If our town has not, maybe it ought. Certainly in our daily life we need good service, and if the town is to grow the street railway should grow with it.

This service may never be perfect, but what human thing is? And that man who runs down the company and all its works because he can't budge a window, ought he not mix with his blame some feeling of appreciation for the service he undeniably is getting—the safe journey in fair weather or foul?

In any case, let us judge our public servants on the same human basis we want to be judged ourselves, not by the little lacks but by the bigger acts.

Published in the interest of Electrical Development by an Institution that will be helped by whatever helps the Industry.

Western Electric Company

No. 22. *The mechanical perfection of each telephone instrument bearing the Western Electric name plate is one basis for confidence in every electrical product which this Company distributes for use in office, home and factory.*

FAIR-PLAY APPEAL IN THE MAGAZINES

Freight Terminals a Problem

New Stations May Be Erected by the Interurbans Now Entering Indianapolis

As a result of the suggestions of the Public Service Commission of Indiana in connection with their recent order covering additional fare increase for the Indianapolis Street Railway the interurban lines entering Indianapolis have held conferences seeking to improve the interurban freight terminals at Indianapolis. It is possible that new freight stations may be established at the Kentucky Avenue and South Street terminal of the Terre Haute, Indianapolis & Eastern Traction Company. This would relieve the congestion at the freight house located in the heart of the city at the Traction Terminal Station.

The Terre Haute, Indianapolis & Eastern Traction Company already has a large freight house on the Kentucky Avenue property and should additional buildings be erected at this point the freight stations adjoining the Traction Terminal building would probably be used for handling express or dispatch freight.

In the conferences held to consider these matters, the Indianapolis Street Railway, which holds contracts with the interurban companies for power, use of tracks and freight terminals, has proposed to cancel the freight provision from the existing contracts between the city company and the interurban companies and to surrender its lease of the Kentucky Avenue freight terminal so that it would be available for all of the interurban companies for such part of their freight business as would relieve the congestion at the present freight house at the Traction Terminal Station.

A question has, however, been raised by the city of Indianapolis as to various provisions of existing contracts and the charges made by the Indianapolis Street Railway to the Interurban lines using its property in Indianapolis. It has, therefore, been suggested by the Indianapolis Street Railway to submit to the Public Service Commission of Indiana the question as to the extent and character of the suggested modifications to be made to existing contracts, so that all interests may be protected. A hearing on this matter was held on Jan. 31.

Court Upholds Commission

The Court of Appeals of New York affirmed, with costs, on Feb. 1 the order in the action of the People ex rel. New York, Westchester & Boston Railway against the Public Service Commission, First District, and decided that the commission had the right to increase above the 5-cent maximum the rate of fare prescribed in the agreement between the city of New York and the railroad.

Judges Hogan and Pound held against the right to increase fare, but Chief Judge Hiscock and Judges Cardozo, McLaughlin, Crane and Andrews decided the question.

To the question, "Is a railroad of the New York, Westchester & Boston Railway a 'street railroad,' within the meaning of Section 18 of Article III. of the Constitution of the State?" the court answered in the negative.

The First Appellate Division held that the commission had jurisdiction to authorize the company to charge a higher rate of fare than that prescribed by the ordinance, provided the rate so prescribed was found by the commission to be insufficient to give the company reasonable compensation for the service rendered, and that the commission was authorized to fix a just and reasonable rate of fare.

Additional Recommendations by Peter Witt at Trenton

The City Commission of Trenton, N. J., has again engaged the services of Peter Witt, Cleveland, to advise it in connection with the problems of the Trenton & Mercer County Traction Corporation, Trenton, N. J. Three years ago Mr. Witt urged the purchase of at least fifty one-man cars. Sixty cars were afterward purchased at a cost of between $350,000 and $400,000, but they have not met with popular favor.

Mr. Witt says he approves of one-man cars, but objects, however, to the narrowness of the platform of the cars used in Trenton. He claims the Trenton company did not purchase the type he suggested. Mr. Witt declares the one-man cars are by far the safest in this section. He stated that the rule in Cleveland was for an operator colliding with another car to consider himself discharged at the end of the run. In his opinion if such a rule was put into effect in Trenton there would be fewer accidents.

Mr. Witt left Trenton on Jan. 28. He suggested that the railway follow out the recommendations made by him when he visited Trenton the first time at the request of the City Commission. Among the plans advocated by him for the betterment of the service were the placing of seats in a longitudinal manner in the one-man cars and the diverting of auto and other traffic from the center of the city during the rush hours.

Non-Rush Hour Service Reduced in Milwaukee

Announcement has been made that the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has increased the headway on eight of its city lines during non-rush hours from one to three minutes. Decreased riding, due to the industrial depression and the mild winter which has permitted the uninterrupted operation of automobiles, is given as the cause for the revision in schedules. The change had the approval of the Milwaukee representative of the Wisconsin Railroad Commission, since the revised schedules would still be above the minimum fixed by the commission. Incidentally, the statement has been made by Superintendent of Transportation Kuemmerlein of the company that the month just ended is the first January in his twenty-six years with the company that it has not been necessary to use a snow plow or sweeper in Milwaukee.

States' Rate Power Overruled

The Michigan Public Utilities Commission has been permanently restrained by the federal court sitting at Detroit from reducing railroad passenger rates from 3 to 2½ cents a mile within the State. The order was issued on application of thirteen Michigan roads. The case was regarded as a test of authority between the State and the Federal government. There is a "twilight zone" between war and peace, said the court's opinion, in which the Federal Congress has the right to fix fares to aid national reconstruction.

State passenger fares in Iowa must be raised to the same level as those prevailing in interstate commerce, the Interstate Commerce Commission ruled on Jan. 24. It said present rates discriminated against the interstate rates.

The commission said that the Iowa case was similar in many respects to the New York and Wisconsin cases on which similar rulings were made. The fares involved, which are to be raised on or before March 1, include a 20 per cent increase in passenger fares.

Double Fare Charge Affirmed

The decision of the Appellate Division that the Brooklyn (N. Y.) City Railroad had the right to charge two fares on the Flatbush Avenue line was affirmed on Feb. 4 by the Court of Appeals. No opinion was written. An order of the Public Service Commission directing the company to cease making the double charge was reversed.

Vincent Victory, assistant to Corporation Counsel John P. O'Brien, who had charge of the case, said:

> The decision is important because it may open the way for double fares on many of the surface lines in Brooklyn which claim the right to charge one fare under a franchise granted in one of the old towns and another fare under a franchise granted by another town.

The Brooklyn City Railroad through its counsel appeared recently before Deputy Public Service Commissioner Morgan T. Donnelly for permission to charge 10-cent fares on the Broadway-Cypress Hills, the Smith Street and Franklin Avenue lines to Coney Island and the Wilson Avenue line from Delancey Street to Canarsie. Counsel argued that the railway was well within its rights in charging an additional 5-cent fare to Coney Island south of the Brooklyn Park Circle. This point is near what was once the dividing line between the old City of Brooklyn and Flatbush. It is claimed that the line south of Park Circle was originally run on a steam railroad franchise which permitted the charge of 3 cents a mile. A public hearing will be held by the commission on Feb. 18.

Transportation News Notes

Tokens in Duluth. — The Duluth (Minn.) Street Railway is now using metal tokens in place of strip tickets. The tokens are sold in lots of fifty for $2.50. The cash fare is 5 cents.

North Shore Line Asks for Three Cents a Mile.—At a recent hearing before the Interstate Commerce Commission the Chicago, North Shore & Milwaukee Railroad, Highwood, Ill., petitioned for an increase in passenger rates to basis of 3 cents a mile. At present the rate in Illinois is 2 cents a mile, while it is 2.7 cents in Wisconsin.

Will Fight Fare Increase.—The City Councils of Gadsden and Attalla, Ala., have voted against an increase in fares asked by the Alabama Power Company. Representatives of the two communities will be sent to Montgomery to contest the application of the company now before the State Public Service Commission.

Would Charge Six Cents.—The Texas Electric Railway, Dallas, Tex., has filed with the City Commission of Sherman an application for permission to charge a six-cent fare on its lines in that city. The present fare is 5 cents. The company states that unless an increased fare is granted service will have to be curtailed.

Two-Man Rule at Issue.—The city of Durham, N. C., has brought suit to compel the Durham Traction Company to operate its cars with two men at all hours. An ordinance passed some time ago instructed the company to place two men on all cars. The result of the order was two-man operation during rush hours. Complete two-man operation is demanded.

All Skip Stops to Go.—The Northern Texas Traction Company, Fort Worth, Tex., will abolish the skip-stop plan of operation, which has been retained on its Fort Worth lines since the war, according to an announcement by George H. Clifford, vice-president and general manager. Skip-stops were abandoned on Jan. 1 last on all of the lines except those located in the downtown section.

Three Cents a Mile on Interurban.—The Winona Interurban Railway, Warsaw, Ind., is now charging at the rate of 3 cents a mile on its interurban lines. This rate has been in effect for some time. In the issue of Jan. 15, page 158, it was indicated that the company had only just filed a petition for an increase to the 3-cent basis. The railway connects Warsaw, Leesburg, Milford, Goshen and other Indiana towns.

Indiana Fliers Named.—From a list of more than 2,000 suggestions the

Indiana Service Corporation has selected the names of "Wabash Valley Flier" and "Hoosierland" for its two new fast trains which are now running between Fort Wayne and Indianapolis. Prizes of $15 for the best names and $10 for the second best names were offered. The trains have been heavily patronized since being put into operation.

"Oncinawile" in East St. Louis.—Not for ever and ever nor for all of the time but only "Oncinawile" will the East St. Louis & Suburban Railway employees issue their new pamphlet giving inside facts on the doings of this Illinois Railway. The editor of the new publication states that stories, personal ones, too, will be accepted. No sermonizing in stories is permitted. All such material will be for the reign of Blue Sundays.

Safety Zones in Indianapolis.—The Board of Safety of Indianapolis, Ind., has decided to establish triangular safety zones at the north intersection of Meridian Street and the Circle, extending north in Meridian Street to the sidewalk line of the Circle and east and west in the Circle to the sidewalk lines of Meridian Street. This will prevent pedestrians from crossing the intersection except in direct line with the sidewalk.

Washington Fares a Problem. — The present rate of fare in Washington, D. C., of 8 cents cash or four tokens for 30 cents expires on March 31. This will necessitate action on the part of the Public Utilities Commission before that date as the old 5-cent rate would become effective automatically on April 1. Since costs of operation have not declined since the 8-cent fare was authorized, it is anticipated that the present schedule on the lines of the Washington Railway & Electric Company and the Capital Traction Company will be maintained until Congress takes action during the extra session.

"Knocking Down" Brings Heavy Fine.—Judge Marshall, in the Mercer County Criminal Court, recently imposed a fine of $200 and costs upon a conductor in the employ of the Trenton & Mercer County Traction Corporation, Trenton, N. J., who was convicted of "knocking down" fares. The trolleyman failed to register thirty-seven fares which he collected on the East Trenton Division. The court in imposing the heavy sentence said it was going to break up the practice of well-paid employees stealing money from the traction company. More conductors are awaiting trial for a similar offence.

Loading Platforms in Pittsburgh.—A number of loading platforms have been put in operation for the convenience and safety of riders by the receivers of the Pittsburgh Railways. More will be installed as soon as arrangements can be completed. The platforms, of wood, are about 70 ft. long and 3 ft. wide and are designed to safeguard those boarding and alighting from cars. Traffic rules require automobiles and other vehicular traffic to pass around the back of the railway loading platform which is guarded with iron railings. Charles A. Fagan, S. L. Tone and W. D. George, receivers of the company, have expressed satisfaction with the platforms and announced others will be installed.

McKinney Fare Rise Under Consideration. — The Texas Electric Railway, McKinney, Tex., has requested the City Council of that city for authority to increase local fares from 5 cents to 6 cents. In reply, Mayor Finch notified the company that the city has no authority under the franchise granted to regulate the rate of fare to be charged. The city authorities also notified the traction company that extensions of service in McKinney were not needed but the construction of a line to the McKinney Junior College was desired. No action has been taken on either the fare request or the extension of lines.

Hearing on Louisville Petition.—The injunction proceedings of the Louisville (Ky.) Railway for the purpose of preventing the city administration from interfering in any way with the proposed plan of increasing fares to 7 cents, was to come up in the United States District Court of Judge Walter Evans, on Feb. 10. Following the filing of the suit the company inserted car cards in its cars reading: "Our case is in the courts because we believe the establishment of our rights will enable us: First, to maintain efficient service; second, to maintain reasonable wages for our employees; third, to pay a fair return to our investors."

Suburban Line Asks Dime Fare.—The Port Jervis (N. Y.) Traction Company has made application to the Public Service Commission, Second District, for authority to charge a 10-cent fare from any point on its line in the town of Deer Park to any point in the city of Port Jervis. The company will maintain its 7-cent fare in Deer Park Township and in Port Jervis. The company alleges that its outstanding bonded debt is $70,000, upon which no interest has been paid since 1914, and that for the last three years the company has not been able to earn sufficient money to pay its operating charges and taxes and that for the years 1913-1919, inclusive, its total deficit is $24,169.

Bus Merger Under Consideration.—Protests have been made before the State Public Utilities Commission of Utah by certain drivers of automobile stages between Salt Lake City and Bingham, against becoming part of a company to be incorporated under the Utah law for the purpose of conducting the stage line. Owing to lack of unity in the stage line, the commission had recommended that it be centralized into an incorporation. The drivers prior to this move had been driving independently and getting a large precentage of what they took in. They object to having their equipment merged into a company. The Utilities Commission has not receded from its position that the business should be centralized. The matter, however, is still under advisement by the commission.

Muskogee Car Order Modified.—The Corporation Commission has granted the application of the Muskogee Electric Traction company for modification of the order of Sept. 2, 1920, granting increased fares. The order provided that 50 per cent of the net revenues from the operation of the company's lines be used for improvement of physical property and service. Company and city officials stated in testimony before the commission that the agreement between the city and company was that 50 per cent of the net profits "received from the operation of the company's lines due to the increased fares" should be utilized for improvements of the property and service. The company asked for modification of the order to comply with this agreement and the application was granted by the commission.

Eight-Cent Fare Stands.—An 8-cent cash fare with four tickets for 25 cents will continue to be collected on the McKeesport (Pa.) lines of the West Penn Railways, Pittsburgh, under the terms of a recent order of the State Public Service Commission. The fare was raised from 5 cents to 8 cents last August. The commission holds in abeyance a complaint of the city of McKeesport and orders that the company continue the new fares for one year, during which time a complete statement of the operating expenses and revenues is to be filed with the commission. The commission also reserves the right for future action on the complaint of service, which the order says patrons of the McKeesport Division can expect to be improved under the new trolley fares. In the opinion the commission indicates that it does not believe that operating costs will continue to increase and that a reduction in fares should be made with the lowering of operating costs.

Will Charge 2.7 Cents a Mile.—The Northern Texas Traction Company, Fort Worth, Tex., has announced a flat increase in fares on its interurban lines between Dallas and Fort Worth, Fort Worth and Cleburne and all intermediate points. The advance in rates will amount to approximately 33⅓ per cent. The new fares will be based on a rate of 2.7 cents a mile. The minimum charge will be 12 cents instead of 5 cents as heretofore. Between Dallas and Fort Worth the new fare will be $1 for one-way passage, or $1.80 for round trip, against 76 cents for one-way passage or $1.35 for round-trip passage under the old rate. George H. Clifford, vice-president and general manager, in announcing the increase stated that the company plans extensive improvements. Four large interurban cars will be ordered at once, and other cars now in service will be overhauled. Improvements will also be made in the roadway and in depot and station facilities. The double track of the Dallas-Fort Worth line will be extended and the number of cars in service on this line will be increased.

Personal Mention

Mr. Gale Honored

Operating Head, Hull Electric Company, Chosen President of the Canadian Association

Meeting at Ottawa, Ont., on Jan. 31 and Feb. 1 the Canadian Electric Railway Association elected as its president for the ensuing year G. Gordon Gale, vice-president and general manager, Hull (Que.) Electric Company. During the past year Mr. Gale has served as vice-president of the association. He has also been a member of the executive committee for several years.

An experience of fifteen years as a railway operator has qualified Mr. Gale to undertake the duties of president of the association. The Hull Electric Company, of which he has been in charge as general manager since 1914, serves a community of more than 30,000 persons. It controls and operates an electric line 30 miles in length connecting Ottawa, Hull and Aylmer, and furnishes power for lighting in several communities.

G. G. GALE

Mr. Gale is a graduate of the electrical engineering department of McGill University. Prior to 1907 he was assistant engineer of the electrical plant of the Canadian Rubber Company. In that year he became superintendent of the Hull Electric Company. In the fall of 1908 he was made acting general superintendent of the company, and a year later was advanced to general superintendent. Five years later he was given the title of manager, and, in 1917, he assumed his present position as vice-president and general manager.

Civic and association duties have for several years occupied much of Mr. Gale's attention. He is a member of Council and past chairman of the Ottawa branch of the Engineering Institute of Canada. He is also an associate member of the Institution of Electrical Engineers of Great Britain and of the Canadian Society of Civil Engineers.

J. B. Woolum Made Pine Bluff Superintendent

J. B. Woolum has been appointed superintendent of the street railway department of the Pine Bluff Company, which operates the street railway, electric light and water systems in Pine Bluff, Ark. Mr. Woolum succceeds J. J. Kress, who has been transferred to special work with the Arkansas Light & Power Company. Mr. Woolum is a native of Arkansas. He was in the train service of steam roads from 1900 to 1911, most of the time with the Missouri Pacific. He then entered the electrical business, and was manager of the Camden electric plant when it was purchased by the Arkansas Light & Power Company in 1914. Later he was transferred to the management of the Russellville plant of the Arkansas Light & Power Company, which serves Dardanelle, Morrilton and other towns. While at Russellville he helped install a 750-kw. turbo-generator with a special furnace for the burning of pulverized fuel. He was succeeded at Russellville by B. C. Fowles, a central station operator of many years' experience in the Southwest.

Mr. Davis to Report on South African Line

William J. Davis, Jr., Pacific Coast engineer, General Electric Company, has been transferred to the International General Electric Company and is en route from San Francisco to South Africa, via London, to make studies in connection with the proposed electrification of the government railroad between Cape Town and Pietermaritsburg, a distance of about 800 miles. This work is expected to take about a year. Mr. Davis graduated from Rose Polytechnic Institute in 1892. After spending three years in construction work he entered the employ of the General Electric Company at Schenectady. In 1898 he was transferred from the testing department to the railway department, where he remained for ten years, working from time to time on a number of the notable early electrifications. Some of these were the Albany & Hudson, the Central London, the London Underground, the New York Central, the Detroit River tunnels and the West Jersey & Sea Shore. For the past eleven years Mr. Davis has made his headquarters in the Pacific Coast office and has gained an intimate knowledge of railroad electrification in the West which will be of great aid to him in his new work.

A. R. Baxter Chosen

Auditor of Indiana Interurban Becomes President of Central Electric Railway Accountants' Association

Amos R. Baxter, auditor of the Indianapolis & Cincinnati Traction Company, Rushville, Ind., was elected president of the Central Electric Railway Accountants' Association at its annual meeting at Dayton, Ohio, on Jan. 22, 1921, to succeed C. B. Kleinhans, auditor of the Toledo Indiana Railroad. Mr. Baxter held the office of first vice-president of the association last year.

Mr. Baxter entered electric railway work with the Indianapolis & Cincinnati Traction Company in the spring of 1908 as a night ticket agent at Rushville, Ind. After serving five months in that position he entered the accounting department as a clerk, and subsequently served in various capacities as assistant cashier, cashier, bookkeeper and chief accountant. In 1917 Mr. Baxter was appointed auditor of the company.

Mr. Baxter was born in Rising Sun, Ind., Nov. 23, 1890. He was graduated from the Rushville High School in 1908.

A. R. BAXTER

The Indianapolis & Cincinnati Traction Company is one of the larger electric interurban systems of the Middle West. It operates 107 miles of line.

New Illinois Commission Named

Frank L. Smith has been appointed chairman of the Public Utilities Commission of Illinois by Governor Small. Mr. Smith is at the present time Congressman from the Bloomington district, having been appointed to succeed the late John J. Sterling. In 1920 he was a candidate for the United States Senate, but the nomination went to William B. McKinley, now Senator-elect. Other commissioners named are Cicero J. Lindly, Greenville, former member of the old Railroad and Warehouse Commission; Patrick H. Moynihan, South Chicago, former alderman and member of Mayor Thompson's traction commission; Harold W. Trevillion, Herrin, editor of the Herrin *News*, and James F. Sullivan, Chicago.

Charles B. Hart, superintendent of the light and power department of the Indiana Service Corporation, Fort Wayne, Ind., since September, 1917, has resigned his position to go into business with his brother in Chicago. He had been connected with the corporation for nineteen years.

A. S. B. Little has resigned as first assistant engineer of the Illinois Public Utilities Commission to accept a five-year contract with the City of New York to handle all rate matters of the city before the state and national courts. Mr. Little has been with the Illinois Public Utilities Commission since 1914.

B. T. Longino has been appointed general superintendent of the Columbus (Ga.) Railroad. Mr. Longino will assume a number of the duties formerly coming under the jurisdiction of C. M. Young, who recently resigned as superintendent of power. Mr. Longino is a native of Georgia. He has been connected with the company for several years.

George B. Anderson has been made manager of transportation of the Los Angeles (Cal.) Railway. The appointment, which was announced by G. J. Kuhrts, general manager, was made effective Feb. 1. As announced in the ELECTRIC RAILWAY JOURNAL for May 15, 1920, Mr. Anderson was the manager of service, in which capacity he had charge principally of the relations of the company both with the public and with its own employees. In his new position he will have added duties along these general lines, besides other work relating to schedules, operation, dispatching, etc.

H. S. Russell has recently taken the position of general superintendent of the St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo. In 1916 he was the electrical engineer of the Denver Gas & Electric Company, Denver, Col., which, like the company at St. Joseph, is controlled by the Doherty interests, but he left in 1919 to become superintendent of distribution for the Empire District Electric Company, Joplin, Mo., another Doherty property. Last year Mr. Russell was promoted to the position of general superintendent of this company. He was graduated from the electrical engineering course of Purdue University in 1908.

Robert R. McCoy, division superintendent of the Illinois Traction System, with headquarters at Staunton, Ill., has resigned that position to enter private business at Oklahoma City, Okla. J. H. Morris, recently stationed at Mackinaw Junction, Ill., as superintendent of the northern lines of the Illinois Traction System, will succeed Mr. McCoy at Staunton. O. C. Genung, former terminal trainmaster at Springfield, Ill., has been appointed superintendent of the northern division of the company, with headquarters at Mackinaw Junction, to succeed Mr. Morris. S. P. Sheibley, former chief dispatcher at Decatur, Ill., succeeds Mr. Genung as terminal trainmaster at Springfield.

Practical Operator Wins Toledo Post

Wilfred E. Cann of Detroit Selected for Position of First Street Railway Commissioner Under Service-at-Cost Plan

When Wilfred E. Cann assumed his duties on Feb. 1 as the first Street Railway Commissioner of Toledo, Ohio, no doubt remained that the city's interest in the local traction system would be efficiently looked after. Mr. Cann takes up his new work with a background of operating experience which well qualifies him to perform the varied tasks that will fall to his lot as Street Railway Commissioner. For the past fifteen years he has served the Detroit United Railway, first as a junior engineer, later as chief engineer and most recently as assistant to F. W. Brooks, president and general manager. The knowledge of operating practice thus obtained has given him a thorough understanding of the engineering, financial and transportation problems which confront the executives of a large urban electric railway.

W. E. CANN won his appointment as commissioner in competition with more than forty other candidates for the position. He was selected by the members of the board of street railway control, Henry C. Truesdall, W. W. Knight and David H. Goodwillie, the appointment being ratified by Mayor Cornell Schreiber. Mr. Cann was highly recommended by Prof. H. E. Riggs of the University of Michigan, who had been called into consultation by the board of control. Professor Riggs formerly conducted an engineering practice in Toledo. He at one time or another made valuations of properties in the vicinity of the city, and served as a member of the board which fixed the value of the "Rail-Light" system. The salary of the Street Railway Commissioner has been fixed at $7,500, the same as that of Mayor Schreiber.

W. E. CANN

Commissioner Cann has held the position of assistant to General Manager Brooks of the Detroit United Railway for nine years. He is 37 years old, and is a native of Winnipeg, Man. He was educated in the Winnipeg public schools and at St. John's College, Winnipeg. Since his graduation from college he has been constantly engaged in railroad work. He entered the service of the engineering department of the Canadian Pacific and for four years did maintenance of way and surveying work for that railroad, the Canadian Northern and the Grand Trunk Pacific. One of his early experiences was on the original survey of the Grand Trunk Pacific route through the Hudson's Bay country.

Fifteen years ago Mr. Cann entered the employ of the Detroit United Railway as a junior in the engineering department. He was later promoted to chief engineer. Since his promotion to assistant to the general manager his work has had to do largely with the network of interurban lines which the Detroit United system operates in southern Michigan.

Commissioner Cann is married and has two sons and a daughter. He has been a member of the Detroit Engineering Society and of the Detroit Board of Commerce. Big game hunting in the Canadian Northwest is his favorite sport.

Commissioner Cann spent his first week in office in "getting acquainted." He set out to make himself thoroughly familiar with the details of his new work, and made a careful study of the system of the Toledo Railways & Light Company, now the Community Traction Company. On Friday, Feb. 4, he made a flying trip to Cleveland, where he conferred with officials of the Cleveland Railway on their methods of checking and of accounting in general. He also collected operating data with a view to instituting measures of economy in Toledo. To the Cleveland traction men he expressed himself as favorably impressed with the accounting system in use there. That system has been in effect in that city for the past ten years.

Sam W. Greenland has been appointed general manager for the receiver of that portion of the Ohio Electric Railway system known as the Fort Wayne, Van Wert & Lima Traction Company. This line extends from Fort Wayne, Ind. to Lima, Ohio. Mr. Greenland will take charge of the operation of this property in addition to the other duties which devolve upon him as vice-president and general manager of the Indiana Service Corporation, general manager of the Fort Wayne & Decatur Traction Company, and president of the Service Coal Company, Fort Wayne.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER,
SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Aluminum Conductor Orders Show Increase

Plenty of Mill Capacity and Raw Material Now Available to Handle Future Business Looming Up

Contrary to conditions existing last year in the aluminum field there is now sufficient capacity available, both raw material and mill, to place aluminum conductor production on a satisfactory basis. Less than a year ago there was little metal that could be turned over to conductor business, but with a decline in output in the automotive and other fields and an increase in orders for conductors, there is now plenty of capacity at hand which it is expected will be devoted permanently to that trade.

There have recently been placed several orders of good size for aluminum conductor, and the outlook for the future is reported particularly bright. Ingot aluminum, 98 to 99 per cent virgin, is quoted now at 28 cents a pound. With 14-cent copper the first cost of these two metals would be about on a par when it is considered that aluminum for equal conductivity weighs just under one-half what copper weighs.

Malleable Iron Castings Deliveries Short

Market Very Quiet and Prices Reduced—Some Foundries Have Lowered Wage and Operating Scale

The supply of malleable iron, which six months ago was all the way from a year to half a year behind orders on hand, has eased up very materially. As regards new business the market is absolutely quiet, for little or nothing in this line is being bought at the present time.

Those manufacturers specializing in supplying the automobile trade have probably been hardest hit by the slump in business, as the automobile industry was about the first to react to the general falling off of demand. The previous press of orders for malleable castings had been so great, however, that some producers are only just now beginning to catch up with their back orders.

Others who were perhaps quicker to feel the buying slump are at present working on a curtailed operating schedule that is down to three days a week in some instances. Wage reductions of 10 to 15 per cent and laying off of workmen have been quite numerous too. On the other hand, many malleable iron factories have taken no steps in that direction.

Deliveries cover a wide range, dependent on the manufacturer and the type of casting. On the whole, the situation is favorable, because mills are now so situated that they can speed up if necessary. In order to keep the working forces intact and busy, however, there is probably a current tendency not to hurry on filling orders unless the need is urgent. This, as well as the large amount of pattern work required on certain material, may account for the extreme delivery period of two to three months that is quoted. From close to stock up to four or five weeks would seem to be a more representative figure. Stocks of finished material, as a matter of fact, virtually do not exist, as the unsteady market makes this inadvisable. For the same reason raw material is being bought in sparing quantities by some of the malleable castings makers.

Prices have trended downward following declines in fuel, pig iron and in some cases labor costs. The reductions made from peak prices average in several instances from 10 to 20 per cent. Further price developments, of course, depend upon the trend of the underlying markets, but according to one of the large companies in this field, which has already made two price reductions during January, the malleable-iron market has not yet touched bottom.

Will Price Cuts Stimulate Buying?

Several Large Equipment Manufacturers, Though Indicating a Desire to Pass Lowered Costs on to Consumer, Discount Effect of This on Buying

Electric railways on the whole are playing fair with manufacturers with regard to the price situation, according to the consensus of opinion of more than half a dozen large producers of railway equipment. One or two of the latter, it is true, state that the more prices are reduced, the more traction companies seem to await and expect further reductions. As a general thing, however, manufacturers take an extremely liberal view of the present quiet market, stating that they realize the railways of the country are in a bad way financially, and are unable to buy, regardless of price.

Proceeding on this view equipment manufacturers are building for the future rather than counting upon the present market. Attention is being devoted to the time when business will return to normal, and by making price concessions and by carrying slow accounts for long periods producers are endeavoring to cultivate good will against this return of business.

Without exception each manufacturer interviewed gave it as his opinion that the price cuts would be no stimulous to buying at present, as traction companies are endeavoring to keep their inventories as low as possible. At the same time it can be safely stated that it is a general policy of manufacturers in this field to pass lowered costs squarely on to the consumer. At least one manufacturer, it is true, indicates that no reduction in the price of his product may be expected regardless of lowered costs. This company prefers to tide over the existing period of depression until better demand will warrant the price now in effect. In explanation it might be said that in the above mentioned case, increased costs which the company absorbed during the period of rising prices, automatically preclude any great price drops.

Nevertheless, the policy outlined in this instance is far from being representative, according to the attitude taken by other manufacturers. These frankly say in a number of instances where prices have not changed, that lower quotations may be expected. This applies usually to those manufacturers who have not reduced wages. On some products labor costs are as much as two-thirds of the expense of production. Where wage cuts have been made the reduction is usually passed on, but the point to remember is that after a wage cut of 10 or 15 per cent has gone into effect, a second cut cannot be made very soon again without causing trouble. Where labor costs are still unchanged, there is naturally room for lowered prices. In this connection manufacturers point out that they have taken considerable losses on stocks of high-priced material which had to be sold at low levels during the past few months. This, of course, is equalized when producers stock material on a rising market.

Several manufacturers state that they are fully as much if not more anxious for prices to reach a firm basis than is the buying end of the industry. But as prices of electric railway material have not been inflated as have many commodities in everyday use, it is pointed out that to expect price declines in the same percentage as have taken place in the clothing industry, for example, is but deluding oneself. As was noted in last week's issue, consideration of what may be termed a fair price level on any article must include such factors as labor and raw material cost reductions, the amount of previous price increases, and the further element as to how much competition is involved.

Good Prospects Seen in Line Hardware Field

Although Present Buying is Light, Some Manufacturers Are Going Ahead on a Stocking Program

The market for pole-line hardware is only fair from the standpoint of buying. The present month is usually a period of light buying, but though it is true some utilities are covering their spring needs the general demand is considerably less than normal. As far as prospects for good business go, however, the situation is very favorable, according to several manufacturers. Almost without exception producers express confidence that the contemplated extension of power lines by electric railways and central stations will result in heavy buying in the coming spring.

In accordance with this view some hardware producers are going ahead with production, although on a curtailed basis, for the purpose of piling up reserve stocks.

Other manufacturers have only recently caught up with back orders and so are not able to ship large quantities of other than standard material from stock. Deliveries, on the whole, are good, ranging from stock up to two or three weeks.

Prices have held steady since general decreases, ranging from 5 to 15 per cent, were made during the month of December and the early part of January. In some quarters still lower prices are expected, but in others the view is expressed that present quotations will hold steady.

Apparatus Price Drops Announced

Following recent wage cuts of 10 and 15 per cent, depending on the class of work performed, put into effect at the Schenectady works of the General Electric Company, there have been some reductions in prices of apparatus. The wage reduction, however, it is announced, lowered costs only 4 to 6 per cent.

A general reduction of 10 per cent is now reported, effective Feb. 8, on alternating and direct current motors (including welding apparatus), switchboards, regulators, rotary converters, motor generator sets and generators of all descriptions excepting turbo-generators. Power transformers and turbines have not been changed in price. These price changes are in the list prices, not the discounts, new lists having been published.

Westinghouse industrial motors and motor generator sets have been reduced 10 per cent as of Feb. 9.

Electrical Exports Reach Record Volume

Total for 1920 Passes $100,000,000 Mark —With Lowered Prices Indicated Volume Should Hold Up

One of the most encouraging features of the electrical market now is the volume of apparatus and supplies that is being shipped out of the country. The month of December just passed turned in $13,812,251 worth of electrical exports, the highest value for any month on record. Of course much of this material was ordered months ago when business was more active than it is now. But prices in general were higher then, and with that fact in mind there is not so much chance for a falling off in foreign trade as there would have been had prices remained at their high level.

The exports of electrical materials during 1920 amounted to $102,618,508, fifteen per cent higher than the best previous year on record—1919. There has been a good volume of traction materials shipped out of the country right along and with lower prices in view and bettering rates of exchange there is no reason to expect 1921 exports to be any lower. Hydro-electric developments planned or under way in many foreign countries call for railway electrifications.

Buying of Copper Line Material Nominal During 1920

During the year 1920 buying of rail bonds, trolley ears, crossings, splicers, hangers, etc., was merely nominal as electric railways for the most part placed orders to cover their actual repair needs and no more. The supply was generally favorable except that during the period of transportation delays and labor troubles raw material supplies were held up and shipments lengthened somewhat. At no time, however, did deliveries of rail bonds run much beyond one month and overhead line material three months. These figures, of course, improved to a very great extent during the last half of the year.

Prices present a gradually ascending curve to a peak point reached in about the latter part of the third quarter, and from then on the curve gradually descends. Price increases of from 6 to 15 per cent went into effect on copper line material the last of July, while as late as the end of August the price of rail bonds was increased slightly. The discount on the latter commodity, which early in the year was 12½ per cent, in the last quarter rose to 25 per cent following the decline in the price of copper.

Since the first of the year the market has remained quiet, with railways barely covering their repair needs and no more. Deliveries, of course, are good, running from one to two weeks. Prices have declined the past month under the influence of low copper and in some cases lower labor costs. On January 3 price decreases amounting to 5 per cent were put into effect by two producers, while another dropped the price 15 per cent on the same date. On Jan. 12 a fourth large manufacturer lowered prices 10 per cent.

Asbestos Sheet Demand Light in Open Winter

With the open winter to date, there has been little maintenance required in asbestos materials of such nature as asbestos sheet for lining controller cases, contactor boxes, etc. Buying has been light, for the arc-breaking chambers on electric cars have been called on for little extra heavy duty generally necessitated when snow and ice on the tracks make the going heavy.

There is plenty of asbestos sheet available for this market and the supply of raw asbestos above ground is good. In the past few years, though, the demand for asbestos products has been so great that proper care has not been exercised in all the mines to clean up the properties as the work progressed. Consequently some waste has taken place. This, however, is being overcome and production is progressing in good shape. Prices now are about 25 per cent lower than they were a year ago.

Rolling Stock

Detroit (Mich.) Municipal Railway, it is reported, proposes to purchase this year from 200 to 300 cars of various types. Orders will be placed through the city purchasing department.

Hudson & Manhattan Railroad Company, New York City, has just placed an order with the General Electric Company for 866 ceiling fans for its tube cars. These are similar to the four on the Brooklyn Rapid Transit cars. Installation is expected by June 1.

Illinois Traction System, Peoria, Ill., suffered a loss recently through fire which partly destroyed two freight cars and their contents. The damage to the cars is estimated at $3,500 and to the merchandise at $1,115. The trucks and braking equipment were not damaged to any extent.

The Metropolitan (England) District Railway has received the first installment of an order for 100 cars of a new type, placed some time ago with the Metropolitan Amalgamated Carriage, Finance & Wagon Company, Ltd., of Birmingham. The cost of this order, according to the Jan. 7 issue of the *Electrician*, London, England, is estimated at £750,000, or at present exchange rates in the neighborhood of $2,870,000. The electrical equipment is provided by the British Thomson-Houston Company, Rugby. A photograph of the new cars indicates that they are somewhat similar in construction to the subway cars in service on the New York Municipal Railway Lines. The width of the cars is 9 ft. 6 in., and there are three sets of double doors on each side. A speed of 45 miles per hour is attained on non-stop runs. It is the company's intention to establish a regular service of eight-car trains during the rush-hour periods in place of the five, six and seven car trains now operated.

Utah-Idaho Central Issues $300,000 Notes for Improvements.—The issuance of $300,000 in notes for the purpose of purchasing equipment and rolling stock and making improvements has been authorized by the board of directors of the Utah-Idaho Central Railroad, Ogden, Utah, operating an electric line between Ogden, Utah, and Preston, Idaho. The notes are to be held by the large stockholders of the company. The expenditure for the improvements will be made at once by the company. In fact, 100 new steel gondola cars have been purchased from a Columbus, Ohio, firm and will be delivered to the electric lines within the next two months. The new cars are of the latest type and will have a capacity of 55 tons each. They will be used for the handling of sugar beets, coal, lime, rock, sand and gravel.

Track and Roadway

Oklahoma Railway, Oklahoma City, Okla. — The Corporation Commission has granted additional time, or until September 1, 1921, to the Oklahoma Railway to construct a bridge over Lightning Creek and make loop connections on its lines in Capitol Hill, a suburb of Oklahoma City. By a previous order the company was required to have the bridge completed by December 31, 1920. The company, however, found it impossible to secure the funds because of the depressed financial situation and asked for an extension.

United Traction Company, Albany, N. Y.—The United Traction Company and the Schenectady Railway have been petitioned by the Troy Chamber of Commerce for favorable action in the project of extending their lines through Nineteenth Street, Watervliet, and over the Congress Street bridge to Troy. The Troy Chamber of Commerce after careful investigation of this extension believes that both the railway managements and patrons will benefit if this plan is carried through.

San Francisco (Cal.) Electric Railways.—The cost of the proposed extension of the municipal street railroad into the Haight, Ashbury and Sunset districts will be made by the city engineer at an early date. The extension has been proposed by Supervisor Colonel James E. Power and the public utilities committee recommended that the supervisors finance committee appropriate $8,500 from the municipal railroad fund.

Northern Texas Traction Company, Fort Worth, Tex.—The Northern Texas Traction Company plans to improve its right-of-way and its depot and station facilities. The double tracks of the Dallas-Fort Worth lines will be extended and the number of cars in service on the line will be increased.

Dallas (Tex.) Railway.—The Dallas Railway stands ready to build the single-track extension out Seventh Street from Tyler to Edgefield, thence on Edgefield to King's Highway, as ordered by the City Commission under recommendation of the City Plan Commission, according to announcement by Richard Meriwether, vice-president and general manager. The company has opposed the Seventh Street route and has twice gone to the City Plan Commission in an effort to have the line routed out King's Highway instead. The line will cost about $75,000. Work has been held up pending the laying of a storm sewer on Seventh Street. As the sewer is now complete work on the railway will start soon.

Dallas (Tex.) Railway.—The Dallas Railway during the year 1920 spent $1,500,000 for extensions and betterments in Dallas, according to the annual report of Richard Meriwether, vice-president and general manager. In addition to these extensions and improvements the company has added sixty-two new safety cars to the operating equipment at a cost of $430,000.

Gray's Harbor Railway & Light Company, Aberdeen, Wash.—According to a decision by the City Council the Gray's Harbor Railway & Light Company must pave its tracks on Curtis Street after May 1, and notice in writing to this effect has been sent the company. The company had been given orders to plank the intersection in the interval as a matter of public safety.

Power Houses, Shops and Buildings

Montreal (Que.) Tramways. — The Montreal Tramways is planning the construction of two waiting rooms at Place D'Armes Square in Craig Street.

Southern Pacific Company, San Francisco, Cal. — The Railroad Commission of the State of California has ordered the Southern Pacific Company to erect depot facilities in the city of Oakland upon the block bounded by Webster, Fourteenth, Franklin and Thirteenth Streets.

Augusta-Aiken Railway & Electric Corporation, Augusta, Ga.—The Augusta-Aiken Railway & Electric Corporation of South Carolina will build a terminal station at the southeast corner of Seventh and Calhoun Streets, Augusta. The building, which will be of metal and concrete construction, will cost approximately $12,000.

San Antonio (Tex.) Public Service Company.—The San Antonio Public Service Company is not planning any immediate extension of lines, but will install new machinery and equipment in the power plant on the Conception road and at the substation on Tenth Street at a cost of between $250,000 and $300,000.

Trade Notes

William S. Higbie, electrical engineer, 114 Liberty Street, New York City, has established an inspection and purchasing service for buyers of power equipment, with offices at the above address. Mr. Higbie was formerly with the Chile Exploration Company, New York City.

Electric Service Supplies Holds Sales Conference.—All of the sales force of the Electric Service Supplies Company covering the eastern territory met at the Philadelphia plant, Seventeenth and Cambria Streets for a sales conference last week. The field men were thus kept in contact with the factory for an entire week. The daily discussion of conditions in the railway, central station, mining and industrial fields gave indication of increased activity and an optimistic outlook in those lines.

The McGraw-Hill Book Company has just removed from its old quarters at 229 West Thirty-ninth Street, New York City, to 370 Seventh Avenue. The company occupies the entire tenth floor of the new Penn Terminal Building, extending from Thirtieth to Thirty-first Street, with floor space of 20,000 sq.ft. This is the third home of the book company since its organization in 1909, the two former homes having been in different spaces of the Thirty-ninth Street building.

Arthur H. Abbott, who was formerly connected with the Boston office of the General Electric Company as transformer specialist, has recently gone into business as a manufacturers' agent, with offices at 88 Broad Street, Boston. He is handling Schweitzer & Conrad outdoor-substation equipment and liquid fuses, "Hi-Voltage" air-break switches, "Ohio" lifting magnets and fractional-horsepower motors, automatic electric control manufactured by the Sundh Electric Company, Karge-Baker flexible couplings, and stokers and steam-jet ash conveyors manufactured by the Frederick Engineering Company.

New Advertising Literature

Condulets.—Crouse-Hinds Company, Syracuse, N. Y., has issued a folder illustrating actual condulet installations.

Diesel Engines.—The Western Machinery Company, 900 North Main Street, Los Angeles, has issued a catalog describing and illustrating the "Western" Diesel engines, including stationary and marine types.

Circuit Breaker.—The new U-Relite circuit breaker in capacities up to 60 amp. is described in a bulletin of The Cutter Company, Philadelphia, Pa.

Blowers.—The Electric Blower Company, 352 Atlantic Avenue, Boston, is distributing a six-page leaflet describing its different types of "Marvel" electric blowers, rivot forges, ventilating fans, etc.

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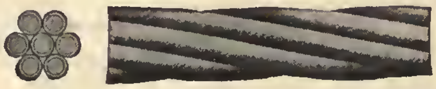
"Copperweld" Weatherproof Wire

Comparative Table of Weights of Weatherproof

Size A. W. G. (B. & S.)	Diameter of Bare Conductor (Inches)	DOUBLE BRAID				TRIPLE BRAID			
		Per 1000 feet		Per Mile		Per 1000 feet		Per Mile	
		Copper-weld	Copper	Copper-weld	Copper	Copper-weld	Copper	Copper-weld	Copper
6	.1620	93.7	100.3	494	529.3	105.2	111.8	555	590
8	.1285	61.	66.1	327	348.8	70.9	75.	374.1	396
10	.1019	43.5	45.7	229	241	0.7	53.	268	280
12	.0808	28.5	30.	150.3	158.2	33.7	35.2	178	185.9

"Copperweld" Electrical and Mechanical Strand



Approximate Size (In.)	Diam. of Each Wire (In.)	Diam. Whole Wire (In.)	Total Cross-Section (Cir. mils)	Approximate Weight		Approximate Breaking Load (Lb.)	Average Resistance per 1000 Ft. at 68 Deg. Fahr.	
				Lb. per 1000 Ft.	Lb. per Mile		30%	40%
7-Wire Strand								
½	.162	.486	183710	526	2775	11340	.197	.148
7/16	.144	.432	145150	418	2221	9140	.248	.186
⅜	.128	.384	114690	332	1745	7560	.313	.236
19-Wire Strand								
⅝	.128	.640	311300	900	4736	20520	.115	.0868
9/16	.114	.570	246920	724	3816	16590	.145	.109
½	.102	.510	197680	568	3014	13680	.183	.138

Comparative Table of Hard-Drawn "Copperweld" and Copper Wire

Size A.W.G. (B.&S.)	Diam (Ins.)	Average Weight in Lbs per Mile		Average Breaking Load (Lb)		Average Resistance in Ohms per Mile at 68 Deg. Fahr.			Size A.W.G. (B.&S.)
		"Copperweld"	Copper	"Copperweld"	Copper	30% "Copperweld"	40% "Copperweld"	Copper	
6	0.162	385	420	1800	1280	7.08	5.33	2.13	6
7	0.144	308	333	1450	1030	8.92	6.71	2.68	7
8	0.128	242	264	1200	828	11.3	8.45	3.38	8
10	0.102	154	166	800	528	17.9	13.5	5.39	10
11	0.091	121	131	645	423	22.6	16.9	6.81	11
12	0.081	96	105	520	337	28.5	21.4	8.56	12

Brochure No. 32 contains complete tables and information.

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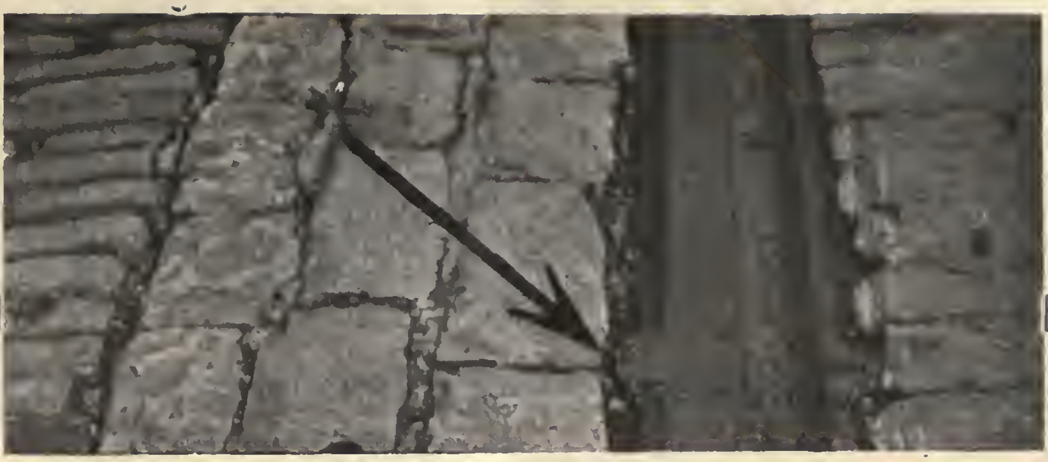

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In a recent address a well-known track engineer of one of the largest electric railway systems in the country, who has tried a number of ways of eliminating the joint, concludes that the Thermit Weld was probably the most satisfactory but he thought it was also the most expensive.

We won't dispute the first half of this statement.

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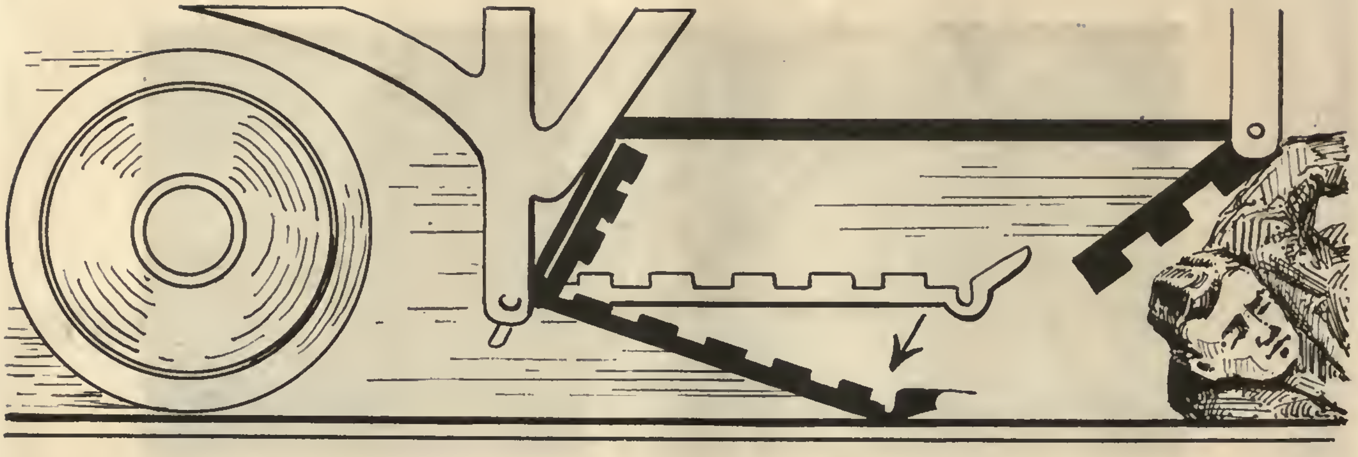

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This great problem of readjustment is the real kernel or reconstruction of which everybody has heard so much and done so little. Reconstruction in this vital sense can no longer be postponed.

There has been plenty of education to inculcate the idea of high wages and low production. The sole and only constructive remedy is adequate education to inculcate the idea of lower levels, a fair day's work for a fair day's pay, and genuine service to the public.

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TRADE MARK
"Bound Brook"
BUSHINGS
"Bound Brook Bushings"
TRADE MARK REG. U.S. PAT. OFF.
MANUFACTURED
(UNDER 16 LETTERS PATENT OTHER PATENTS PENDING)
BY
Bound Brook Oil-less Bearing Company
Bound Brook, N.J.

Two-thirds of the electric railway systems of America recognize this package. For the protection of the other one-third we'll state it's green.

Put this bushing in every trolley wheel

Look over that stock of trolley wheels you have on hand. See if the box is labeled "Bound Brook." If not, hustle an order to us right away and replace every one of the bearings with "Bound Brook" Oil-less Trolley Wheel Bushings.

We urge you to do this in the interest of economy. A "Bound Brook" Bearing outwears the wheel itself and requires no lubricant, no attention and no replacing. The first cost is the only cost.

All Genuine Graphited Oil-less Bushings have always been made at Bound Brook, U. S. A.

Bound Brook Oil-less Bearing Co.

Specialists in the manufacture of Oil-less Bushings for more than a third of a century

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Because of the nature of the service, Electric Street Railways should demand and can secure prompt deliveries of lubricants.

The Texas Company has adequate facilities for speedy delivery in any quantity to any electric street railway company, any time, anywhere.

We maintain District Offices at most prominent industrial and rail centers. Over 600 of the Company's stations for delivery of lubricants and other products are scattered throughout the country.

In addition to this, we maintain over 600 warehouses, hundreds of storage tanks, huge fleets of auto trucks, and over 5,000 tank cars.

Texaco Service means the right oil for the right place at the time you need it.

Within our delivery radius from all of these stations, we can assure our customers against vexatious freight delays.

Whether you mail, wire, or 'phone your orders, we execute them with a "zip."

Last Advertisement—"Crude Resources."
Next Advertisement—"The Fallacy of the Guaranteed Contract."

There is a Texaco Lubricant for Every Purpose

THE TEXAS COMPANY
DEPT. R.J. 17 BATTERY PLACE. NEW YORK CITY
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OFFICES IN PRINCIPAL CITIES

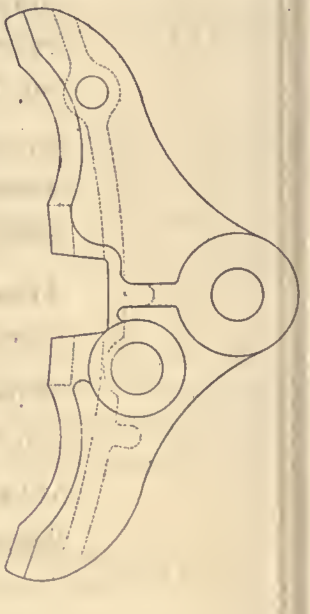
Poorly adjusted shoes do this

Boyerized Manganese Heads Would Stand the Gaff!

Lots of things can make trouble for common brake shoes, for instance: mean offside wear at the edges or ends of the head and at the key lug.

With Boyerized Star Brand Manganese Heads in use, the only consequence of badly fitted shoes would be a bit of shine or scour and your shoe adjustment period would be coming around long before anything happened to the head.

That's why Boyerized heads live at least four times as long. Just as true of these other Star Brand Manganese Specialties.



Brake Hangers	**Spring Post Bushings**
Brake Fulcrums	**Side Bearings**
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Spring Posts
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"So tough they cannot be drilled, and still pliable enough to bend without breaking."

They'll go well with your Boyerized Brake Pins and Bushings.

ELECTRIC RAILWAY SUPPLIES

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Springfield, Mass.

Irvington Slot Insulation Speeds Repairs

It is absolutely the newest thing out. And it is the best because it saves time and cuts labor costs.

Irvington Slot Insulation consists of a layer of varnished cambric and a layer of fibrous paper solidly cemented together. It is made in thicknesses from 12 mils to 30 mils and is furnished in sheets, roll form or strips cut to specification.

Dielectric strength of Irvington Slot Insulation varies from 600 to 750 volts per mil, depending upon thickness.

Irvington Slot Insulation has made good instantaneously because it fills a long felt want. You may need some also.

Ask us for samples and prices

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Oiled Silk Varnished Paper
Black and Yellow
Varnished Cambric
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Special Folded Paper
for
Coil Windings
Special Adhesive
High Dielectric Paper
Insulating Varnishes

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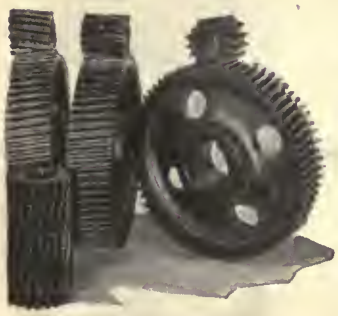
"Tool Steel" Quality **T. S. Q.** "Tool Steel" Quality

White paint illustrates softened end of teeth on motor side of pinion. This eliminates chipping. (Patent pending)

"Tool Steel"

HELICALS

are just as superior
in *quality* as
"Tool Steel"
SPURS.



"Tool Steel" Helical gears—in sets, or interchangeable with other makes.

"Tool Steel" Quality **T. S. Q.** "Tool Steel" Quality

Muskha

About the only 20th century habit in vogue among Turkish maidens is posing for pictures on cigarette boxes.

When they churn Muskha, or butter, they do it in the same primitive way that has been in use for a thousand years or more.

A large goat skin filled with sour cream is suspended horizontally by cords tied to the extremities and this is swung back and forth until the butter "comes."

Due to Turkish coffee, or Turkish cigarettes, or something, a few central station operators seem to have the same reluctance about adopting modern methods.

Instead of putting up with brush trouble they could call in a Morganite prescriber who would concoct a brush exactly suited to operating conditions—

Exit trouble!

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Main Office and Factory: 519 West 38th Street, New York

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"The 'Standard' Brand on your material is an assurance of eventual economy."

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A Low Whisper At High Speeds

The modern electric locomotive weighs 275 tons and the safety car only eight tons.

These two types of rolling stock represent the extremes in weight and power to which electric railways have gone to obtain the highest efficiencies.

Nuttall silent helical gears are used on the latest types of both these extremes as well as on all intermediate types and the success which helical gears have met proves their worth.

Some of the reasons for their success are:

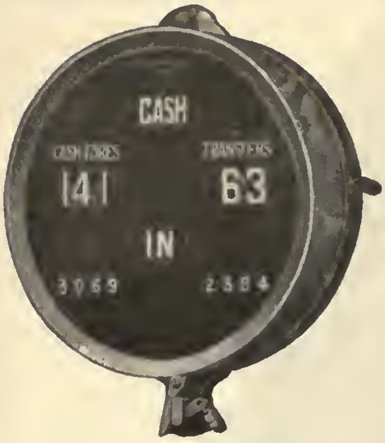
1. Quiet operation.
2. Absence of vibration.
3. Increased life.
4. Reduction in maintenance cost.

A low whisper at high speeds is the only sound that Nuttall Helical gearing makes.

Nuttall

REPRESENTED IN THE UNITED STATES BY WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY DISTRICT OFFICES

R.D.NUTTALL COMPANY
PITTSBURGH PENNSYLVANIA



Type R-5. Double Register

International Fare Registers

Accurate and Reliable Registration

INTERNATIONAL Fare Registers have for a quarter of a century stood the test of service. They have been and are today the standard equipment of the leading Electric Railways and city systems of this country.

Their accurate and reliable registration and rugged construction is responsible for their excellent service reputation.

Cars equipped with money counting fare boxes need this visible and audible registration of the fare register as an additional check against the fare box. Where non-registering fare boxes are used a fare register affords the only method of checking against the fare box. Only by their use can the registration of paper tickets and transfers be made.

Manufacturers of

Single registers, round and square; double registers, duplex counters, car fittings, foot-operating devices for single and double registers. Exclusive selling agents for Heeren enamel cap and coat badges.

The International Register Company
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Westinghouse-Frankel Solderless Cable Taps

Note the extreme simplicity of splicing with Westinghouse-Frankel Solderless Cable Taps. No solder or blow torch needed and the high cost of experienced labor eliminated.

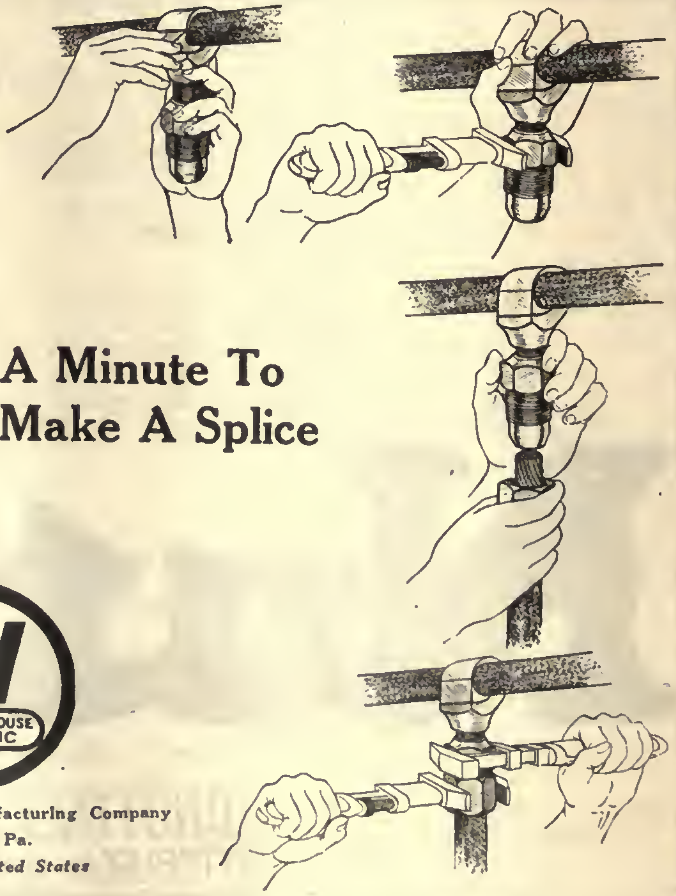
Heat is not employed. Consequently the insulation on either side of the joint is unimpaired.

These cable taps stand maximum overload without injury and their efficiency is not decreased by indefinite re-use.

Neat, compact, and strong with no loose parts to get lost.

You will eliminate guess work in your wiring jobs by using Westinghouse-Frankel Solderless Cable Taps. Why not stock up at once?

Send today for Miniature Catalogue 1-B-3.



A Minute To Make A Splice

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WESTINGHOUSE ELECTRIC

MAKERS - THE BEST ONLY
FRANKEL
CONNECTOR CO. INC. N.Y.

Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pa.
Sole Agents in the United States

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The cost of the material is generally a small item as compared with the cost of labor for installing it.

When you specify and use ALL-HEART

CYPRESS

"THE WOOD ETERNAL"

for such purposes you know that it is going to give service for a long time, and that you are *not* going to be up against a continuous big *labor cost* for renewals and replacements.

Of course even Cypress may eventually have to be replaced. Nothing lasts quite forever. But in the long service life you get from Cypress you will have *saved* a lot of labor costs in *maintenance alone*.

Anyway, that's why a number of the biggest railways in the country *insist* on ALL-HEART CYPRESS.

"BUY BY THE CYPRESS ARROW."
LOOK FOR THIS MARK ON THE END OF EVERY BOARD—AND ON EVERY BUNDLE.

Our data is at your service.

SOUTHERN CYPRESS MFR'S ASS'N.

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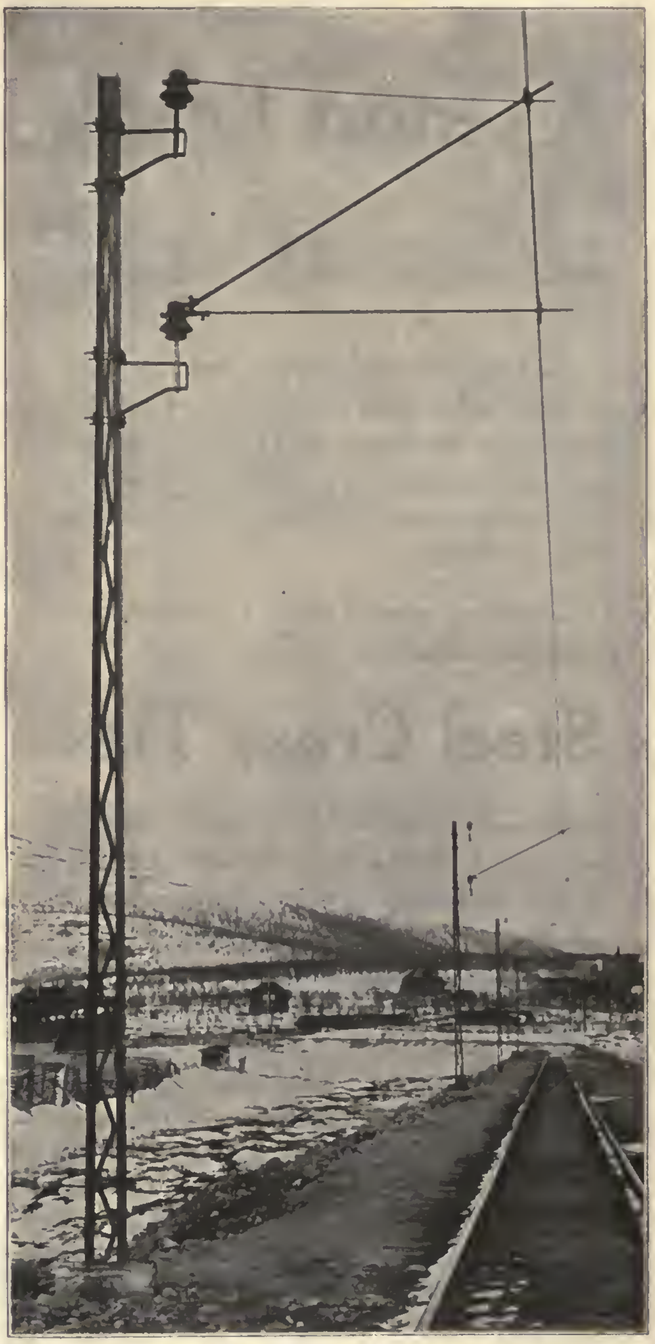

Bates One-Piece Steel Poles in Lapland, Sweden

These Extended Steel Poles are being used by the Royal Swedish State Railways to give permanent construction in Lapland, Sweden—75 miles north of the arctic circle. Climatic conditions are extremely severe in this wind swept arctic solitude Patroling this line is impossible at times, replacements are prohibitive—the construction just had to be permanent and reliable as well as economical, so Bates Poles were chosen.

The engineers of the Swedish government who made this installation have recommended and specified Bates Poles many times since then and we ship them thousands of poles yearly. This installation demonstrated beyond any doubt that Bates One-Piece Steel Poles are dependable, permanent and decidedly economical.

Your construction is permanent when you use Bates One-Piece Steel Poles. Their economical tested strength gives unfailing service.

Our New 1921 TREATISE AND HANDBOOK sent upon request.

Bates Expanded Steel Truss Co.

208 South La Salle Street
CHICAGO, ILLINOIS

A Good Track

In economical railway operating, a good track is of prime importance. Not only is it economical but the safety of the passengers is dependent upon it to a large degree.

A track laid on wood cross ties is a liability after a few years of service. Constant repairs are necessary and frequent tearing up the street to put in new ties is a common occurrence. The end of a wood tie is the bonfire.

To insure a good track, Carnegie Steel Company recommends its

Steel Cross Ties

Expensive, yes, if first cost alone is considered. But wise investments are not figured that way. The track laid on steel ties is a permanent one. Once laid, they are there to stay—will outwear the life of the rails—and can be reused, if desired, in other track. At the end of their usefulness as cross ties, they can be sold as scrap at approximately one-third their original cost.

Considering long service, the element of safety, freedom from repairs, scrap value, and the satisfaction from their use, track laid on steel cross ties is the cheapest track obtainable—also the best.

If you are considering laying new track or repairing old, our engineers would be glad to discuss the matter with you. A copy of our pamphlet—Steel Cross Ties—would also be helpful. It contains interesting examples of roadbed construction and other valuable information. A copy may be had on request to nearest district office.

Carnegie Steel Company

General Offices: Carnegie Building, Pittsburgh, Pa.

1119

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the equipment or machinery that you are not using. This may be occupying valuable space, collecting dust, rust and hard knocks in your shops and yards.

Sell it Before Depreciation Scraps it

The Searchlight Section is Helping Others—Let it Help You Also

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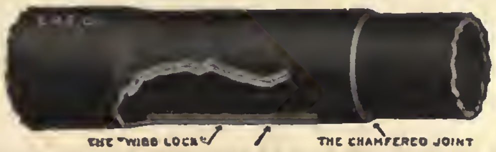
ELRECO TUBULAR POLES



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Lowest Cost
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Lightest Weight
Greatest Adaptability

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AETNA INSULATION LINE MATERIAL
Third Rail Insulators, Trolley Bases, Harps and Wheels, Bronze and Malleable Iron Frogs, Crossings, Section Insulators, Section Switches.

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STANDARD
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RAILROAD TIES, SWITCH TIES and
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Track Bolts
and Spikes
Abbott Rail-Joint
Plates

Send for booklets, "Lackawanna Deseamed Rails," "Improved Track Appliances," "Track Bolts and Spikes."

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Established 1858

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ESTIMATES PROMPTLY FURNISHED

Peirce Forged Steel Pins
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Your best insurance against insulator breakage

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PITTSBURGH, PA.

Transmission Line and Special Crossing
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Means lasting improvement of track return, thus more uniform line voltage and less motor trouble.

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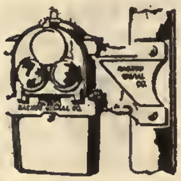

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TUBULAR STEEL POLES
For all Traction and Electric Transmission Purposes
Ask for "NATIONAL" Bulletin No. 14, "NATIONAL" Tubular Steel Poles
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"ACME" (NESTABLE)
Anti-Corrosive
NO-CO-RO METAL
Galvanized
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CULVERTS

Dug up after 9 years—In fine condition

A 20-inch "ACME" (Nestable) Corrugated Culvert was dug up recently near Ottawa Lake, Michigan, and a larger "ACME" put in its place. Mr. Wm. Schroeder, the *Highway Commissioner*, says:

"Nine years ago I put in that 'ACME.' I certainly was surprised to find that the sections showed no signs of rusting thru. Except for dirt, they looked as good as new." (*See above illustration.*)

"ACMES" withstand the action of earth elements so well because they are made of NO-CO-RO a rust-resisting metal. Write for Catalog M-21.

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Circuit Breakers
for heavy street railway work are the best obtainable. Write for New Complete Catalogue.

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A necessity for turbine protection, engine cylinder economy and utilization of superheat for all its benefits
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The Circuit Breaker with Brains

The
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KNOWS When to Open
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AND DOES IT
AUTOMATICALLY

The Automatic Reclosing Circuit
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For the sake of Complete Protection to your equipment and service
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The equipment you do not need can usually render good service elsewhere. You can reach the largest group of buyers of such equipment at small cost through an ad in the

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IN 1898
STEAM SUPERHEATERS
Were introduced commercially in the United States by this Company. Owners of boilers it has built—Babcock & Wilcox, Stirling and Rust—not now equipped with these coal-saving accessories can obtain information about superheating possibilities from the nearest office listed below.

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"Union" Renewable Fuses will save four-fifths of your fuse maintenance cost. Guaranteed to give satisfaction. Money back if they fail. Booklet on request.
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Waterproofed Trolley Cord

Is the finest cord that science and skill can produce. Its wearing qualities are unsurpassed.

FOR POSITIVE SATISFACTION ORDER SILVER LAKE

If you are not familiar with the quality you will be surprised at its ENDURANCE and ECONOMY

Sold by Net Weights and Full Lengths

SILVER LAKE COMPANY
Manufacturers of bell, signal and other cords.
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Electric car heaters—thermostatic control—pneumatic car door operators—buzzers, single-stroke bells, starting signal lights—special resistances.

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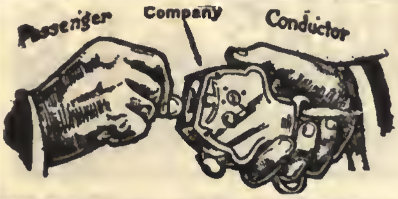

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By the
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Rooke Automatic Register Co.
Providence, R. I.

A Style for Every Service

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Cleveland Fare Boxes protect all the fares. They accommodate any rate of cash fare and any kind of ticket.

The Cleveland Fare Box Company
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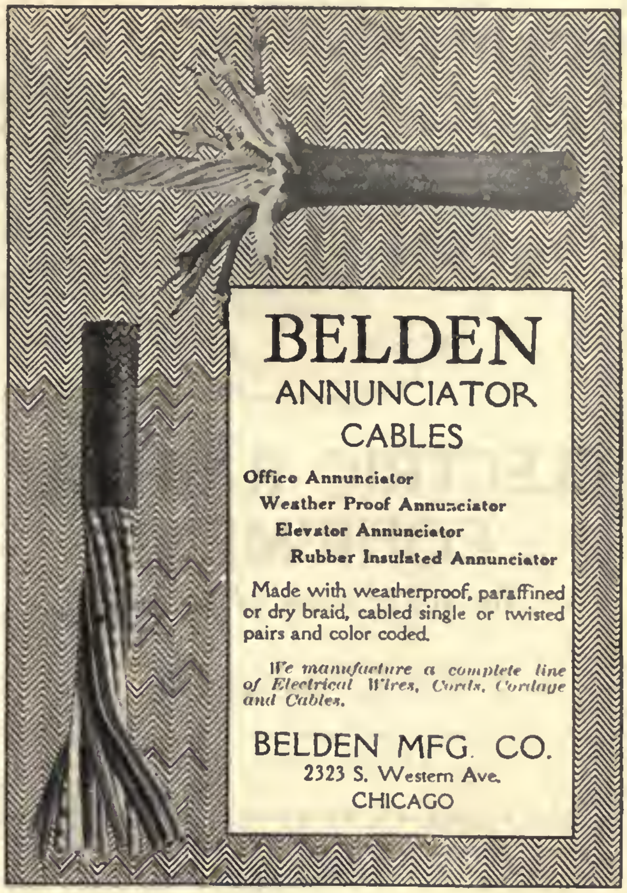

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Made with weatherproof, paraffined or dry braid, cabled single or twisted pairs and color coded.

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GOLD

ELECTRIC HEATERS Cut Installation and Maintenance Charge.
VENTILATORS Also Ventilate in Stormy Weather.
THERMOSTATS Save Current.
ORIGINATED the use of NON-CORROSIVE Wire for Electric Car Heaters.
ORIGINATED The Ventilated Coil Support.

LET US FIGURE ON YOUR NEXT REQUIREMENTS
Gold Car Heating & Lighting Co., 17 Battery Pl., New York

Heating and Ventilating

Let us demonstrate to you how we can heat and ventilate your cars at the lowest possible cost

The Cooper Heater Company
Carlisle, Pa.

SAMSON SPOT WATERPROOFED TROLLEY CORD

Trade Mark Reg. U. S. Pat. Off.
Made of extra quality stock firmly braided and smoothly finished.
Carefully inspected and guaranteed free from flaws.
Samples and information gladly sent.
SAMSON CORDAGE WORKS, BOSTON, MASS.

ELECTRIC RAILWAY EQUIPMENT

for all classes of service

City and Interurban Cars and Trucks,
Snow Sweepers and Plows

Express, Combination and Work Cars,
Electric Locomotives

McGUIRE-CUMMINGS MFG. CO.
General Offices: 111 West Monroe St.
CHICAGO

They are uniform in quality

They talk for themselves

W. J. Jeandron
227 Fulton Street
New York City

Pittsburgh Office:
636 Wabash Building

Canadian Distributors:
Lyman Tube & Supply Co., Ltd.
Montreal and Toronto

MORE-JONES "TIGER-BRONZE" AXLE AND ARMATURE BEARINGS

Not always the cheapest, but ever lowest in ultimate cost

MORE-JONES BRASS & METAL CO.
St. Louis, Missouri.

Use them in your terminals—

PEREY TURNSTILES or PASSIMETERS

Faster than the ticket seller

Perey Manufacturing Co., Inc.
30 Church Street, New York City

J.H. WILLIAMS & CO

"THE WRENCH PEOPLE"

Brooklyn · Buffalo · Chicago

A Single Segment or a Complete Commutator

is turned out with equal care in our shops. The orders we fill differ only in magnitude; small orders command our utmost care and skill just as do large orders. CAMERON quality applies to every coil or segment that we can make, as well as to every commutator we build. That's why so many electric railway men rely absolutely on our name.

Cameron Electrical Mfg. Co., Ansonia, Connecticut

FORD TRIBLOC

A Chain Hoist that excels in every feature. It has Planetary Gears, Steel Parts, 3½ to 1 factor of Safety. It's the only Block that carries a five-year guarantee.

FORD CHAIN BLOCK CO.
Second and Diamond Sts., Philadelphia

FORT PITT SPRING AND MANUFACTURING CO.
PITTSBURGH, PA.
Manufacturers of
COIL AND ELLIPTIC
SPRINGS
FOR
RAILWAY SERVICE

DREW MOTORMEN'S SAFETY MIRRORS

Eliminate Accidents

Send for Catalogue No. 18

DREW ELECTRIC & MFG. CO.
Collamer Ave. and Nickel Plate
Railroad, Cleveland, O.

ELECTRIC RAILWAY JOURNAL

Think "SEARCHLIGHT" First

ADVERTISING RATES

POSITIONS VACANT—Business Opportunities and other undisplayed ads, 8 cents a word, minimum $2.00 an insertion.

POSITIONS WANTED—Evening work wanted, tutoring and other undisplayed ads of individuals looking for employment, 4 cents a word, minimum 75 cents, payable in advance.

ADD 5 WORDS for box number in undisplayed ads if replies are to any of our offices. There is no extra charge for forwarding replies.

DISCOUNT OF 10% if one payment is made in advance for 4 consecutive insertions of undisplayed ad.

ADS IN DISPLAY TYPE—Space is sold by the inch (30 in. to a page), the price depending upon total space used within a year, some space to be used each issue.

RATE PER INCH for ads in display space:
1 to 3 in., $4.50 an in.
4 to 7 in., $4.30 an in.
8 to 14 in., $4.10 an in.
15 to 29 in., $3.90 an in.
30 to 49 in., $3.80 an in.
50 to 99 in., $3.70 an in.

POSITIONS VACANT

EMPLOYMENT

POSITIONS WANTED

POSITIONS WANTED

EXPERIENCED outside construction man desires position in way of electric railway, lighting, underground and submarine cables. Most experience in city of 200,000 population. Can produce results. PW-828, Elec. Ry. Journal, Real Estate Trust Bldg., Phila.

EXECUTIVE, practical self-made man with broad experience and splendid record in the operation of both steam and electric railways would like to get in touch with parties desiring the services of a high-class operating man. All inquiries will be treated confidential. PW-835, Elec. Ry. Journal, Real Estate Trust Bldg., Phila.

POSITION wanted as superintendent of overhead or track or both positions combined. Have had 10 years' successful experience in a similar position. Will furnish very best references. PW-838, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

SUPERINTENDENT of transportation desires a change; 41 years of age, nearly 18 years' experience on large city property; possessing full knowledge of all details of transportation; capable of taking over any city or suburban property and getting results; successful in handling public and labor; best of references. PW-836, Elec. Ry. Journal, Old Colony Bldg., Chicago.

SUPERINTENDENT of transportation desires a change; 41 years of age; progressive, capable, possessing full knowledge of all details pertaining to transportation, having had nearly 18 years on large city and suburban property; successful in dealing with public and employees. Will consider any property that requires extra effort and ability to build up; best of references as to character. PW-837, Elec. Ry. Journal, Old Colony Bldg., Chicago.

DO YOU NEED MORE CAPITAL?

Our client stands ready to furnish additional capital to manufacturers

Application treated confidentially. State when organized, capitalization, amount of stock issued, classes of stock; dividends paid if any. Money promptly available. Be explicit; save time and correspondence.

Address Dept. H., c/o **De Forest Porter Adv. Service**
12 Root Bldg., Buffalo, N. Y.

WANTED TO BUY

1—Interurban Passenger Motor Car fully equipped.
1—Combination Line and Work Car 40 ft. to 45 ft. long.
3—60,000 lb. Capacity Express Trail Cars.
6—West. H. L. Control Equipments.
20—90 to 100 H.P. Interpole Motors.
1—Westinghouse No. 121—Motor Complete.
1—Gen. Elect. No. 205B Motor Complete.

HENRY C. PAUL, ***Receiver***
FT. WAYNE, VAN WERT & LIMA TRAC. CO.
331 PEARL ST., FT. WAYNE, IND.

FOR SALE

ASH BLOWER SET

complete, G.E. No. 1793, Type T. 3300, 15 lb., 3450, Form A, Speed 3450.

LEO L. HUNTOON, ***Purchasing Agent***
Joseph K. Choate, Receiver,
The Aurora, Elgin & Chicago R.R.
Aurora, Illinois.

700 tons new 9 in.

GIRDER RAIL

Penna. Steel Co. Section 228, 107 lb. to the yard. Attractive price upon application. Subject to R. W. Hunt & Company's Inspection. Prompt shipment,

H. M. FOSTER COMPANY
Continental Building, Baltimore, Md.

COMPLETE POWER PLANT

FOR SALE

1—500 h.p. Westinghouse Compound Engine, Direct Connected to 550 volt Generator.
2—200 h.p. Harrisburg Engines, Belt Connected to Westinghouse Generators.
1—B & W Boiler, 2 Keeler Boilers, Water Heaters, Pumps, Piping, Switchboards and etc.

All in first class operating condition. Immediate delivery. Make us an offer.

The Lewistown & Reedsville Electric Railway Co., Lewistown, Pa.

EVERYTHING FOR TRACK

New and Relaying Rail

FITTINGS AND TOOLS

TRACK SPECIALTIES CO.
29 Broadway, New York City.

New—Used—Rebuilt

MACHINERY AND SUPPLIES
for construction and industrial work

READING ENGINEERING CO., INC.
154 Nassau St., New York

NEW—80-LB. RAIL and ACCESSORIES

Angle Bars, Spikes, Bolts and Nuts Complete

FOR SALE

A.R.A. "TYPE B" RAIL

Approximately 30,000 gross tons—standard lengths

Stored at Kearney, New Jersey

We buy electric and steam railways that are to be dismantled

HYMAN-MICHAELS COMPANY

NEW AND RELAYING RAILS

Peoples Gas Building, Chicago, Ill.

New York Office:
1324-1326 Woolworth Bldg.

Pittsburgh Office:
1312 First National Bank Bldg.

St. Louis Office:
2115 Railway Exchange Bldg.

TRANSFORMERS

FOR SALE

4—135 kva. General Electric Transformers, Type HS, Form RT, Cycles 60, Cap. 200 kw. 17100/19100/33000Y 370/370/185.

Excellent Shape—Practically New

2—135 kva. General Electric Transformers, Type HS, Form RT, Cycles 60, Cap. 200 kw. 2300/——17100/19100/33000Y.

Union Traction Company
Nashville, Tenn.

One combination electric weld and copper weld rail

BONDING CAR

Complete with cast weld outfit for 550-600 volts. Bonding car equipped with West. equipment, and is in A1 condition. Sold subject to agreement with Electric Improvement Company. Your best bid solicited.

W. A. LOVEJOY, P. A.
Atlantic Shore Railway, Kennebunk, Maine

For 20 Years

we have been
Buying and Selling

Second-Hand Cars

Trucks and Motors

At Your Service

ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa.

NEW
REBUILT

ELECTRIC MOTORS

REWINDING
REPAIRING

NEW A.C. MOTORS ¼ to 15 H.P.—LARGE STOCK USED MOTORS
EXCELLENT REPAIR SERVICE ON ANY SIZE OR TYPE

CLEVELAND ARMATURE WORKS, INC.

EST. 1895 4732-4-6 ST. CLAIR AVE., CLEVELAND O. *INC. 1918*

FOR SALE—IMMEDIATE SHIPMENT

200 kw. Genl. Electric Belted Railway **Generator**; 525/575 volts, 348 Amps., 425 rpm.; type MP, class 6-200-425, form H; complete with sliding base, pulley and generator panel; first class condition.

ARTHUR S. PARTRIDGE
415 Pine Street, Saint Louis

Some One Wants to Buy

the equipment or machinery that you are not using. This may be occupying valuable space, collecting dust, rust and hard knocks in your shops and yards.

Sell It Before Depreciation Scraps It

THE SEARCHLIGHT SECTION IS HELPING OTHERS

Let It Help You Also

0209

MACHINERY IN STOCK FOR IMMEDIATE SHIPMENT

STEAM TURBO GENERATING SETS

1—10,600 kw. (13,600 kva.) Westg. 3 ph., 60 cy., 13200 v., 1800 r.p.m. Turbo Unit with Le Blanc Jet Condenser.
1—1500 kva., 2300 v., 3 ph., 60 cy., 3600 r.p.m. Gen. Elec. Turbo Outfit with condensing equipment.
1—1500 kva. Gen. Elec. Curtis 25 cycle turbo unit, 3 ph., 1500 r.p.m., 370 volts, 175 lb. steam pressure.
1—400 kw. Westg., 3 ph., 60 cy., 2200 v., 3600 r.p.m. turbo unit.

FREQUENCY CHANGER SETS

1—1000 kw., 1350 kva., G. E., 3 ph., 62.5 cy., 5400/2700 v., 375 r.p.m. generator dir. ctd. to 1060 hp., 3 ph., 25 cy., 6600 v., 375 r.p.m. motor.
1—500 kw., G. E., 3 ph., 60 cy., 2300 v., 750 r.p.m. generator dir. ctd. to 700 hp., 3 ph., 25 cy., 13300 v., 750 r.p.m. motor.
1—500 kw., G.E., 3 ph., 60 cy., 4160 v., 300 r.p.m. generator dir. ctd. to 800 hp., 3 ph., 25 cy., 9000 v., 200 r.p.m. motor.

MOTOR GENERATOR SETS

1—1000 kw., Westg., 125/250 v., 284 r.p.m. generator dir. ctd. to 1400 hp., 3 ph., 60 cy., 6600/4000 v., 284 r.p.m. motor.
1—200 kw., G. E., 250 v., 900 r.p.m. generator dir. ctd. to 300 hp., 2 ph., 60 cy., 2400 v., 900 r.p.m. motor.
2—100 kw., Westg., 6 pole, 600 v., gen., each dir. ctd. to 150 hp., 3 ph., 25 cy. motor. These are self contained units on cast iron sub-bases.

ROTARY CONVERTERS

1—500 kw., Westg., rotary, 6 ph., 25 cy., 440 v., A.C., 600 v., D.C., 500 r.p.m.
1—500 kw., Gen. Elec., rotary, 600 volt, 60 cy., 1200 r.p.m.
2—300 kw., Westg., 3 ph., 60 cy., 370 v., A.C., 600 v., D.C., 600 r.p.m.
2—300 kw., G. E., 25 cy., 370 v., A.C., 600 v., D.C., 750 r.p.m.
1—150 kw., Westg., 3 ph., 60 cy., 370 v., A.C., 575 v., D.C., 730 r.p.m.
2—150 kw., Gen. Elec., 25 cy., 370 v., A.C., 600 v., D.C., 750 r.p.m.

TRANSFORMERS—25 CY.

6—500 kva., G. E., 13200 prim., 480 secy.
3—200 kva., Westg., 16500 v., prim., 400 secy.
3—200 kw., G. E., 6450 v., prim., 170 secy.
3—185 kva., G. E., 2300 v., prim., 430 secy.
3—150 kw., G. E., 6000 v., prim., 82 secy.
3—125 kw., Westg., 2200 v., prim., 220 secy.
2—75 kva., G. E., 13800 v., prim., 115/230 secy.
3—50 kva., G. E., 13200 v., prim., 115/230 secy.

TRANSFORMERS—60 CY.

1—7500 kva., Westg., 44000/22000-13500 vs.
3—2000 kva., G. E., 60000 v., prim., 6600-13200/32000 v., Y secy.
3—2000 kva., G. E., 60000-2300/4000 Y vs.
3—1250 kva., 3 ph., G. E., 30400/13200 prim., 2400/2200 v., secy.
4—750 kw., G. E., 44000/43000/42000 prim., 6600 secy.
6—600 kva., G. E., 23000/13200 volts.
3—400 kva., Allis-Chalmers, 6600-440 vs.
3—300 kva., G. E., 2200 prim., 370 secy.
3—150 kva., G. E., 6600-120/240 volts.
4—150 kw., Allis-Chalmers, 33000 v., prim., 2300 secy.
6—110 kw., G. E., 14500-13830 v., prim., 436-280-143 v., secy.
3—100 kw., G. E., 6200 v., prim., 2300 secy.
2—100 kw., G. E., 6600/5740 prim., 2760/2400 secy.
3—100 kw., G. E., 6000 v., prim., 665/584 secy.
3—100 kva., Westg., 11000-600 volts.
3—100 kw., Westg., 440 v., prim., 320 secy.
3—75 kva., G. E., 11000/9000-6000 vs.
3—75 kva., G. E., 2300 v., prim., 370 secy.
2—75 kva., Allis-Chal., 6600 v., prim., 440 secy.
3—55 kw., G. E., 2300/2070-370/230/135 vs.
3—50 kva., Westg., 6600/6300/6000 v., prim., 440/330 secy.
2—50 kw., Westg., 5000/6600 v., prim., 1000/1100/2000/2300 v., secy.

ARCHER & BALDWIN, Inc.

Telephone 4337-4338 Rector
114-118 Liberty Street, New York City

SEARCHLIGHT SERVICE

Covers the advertising of

Agencies Wanted
Agents Wanted
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Buildings for Sale
Business Opportunities
Civil Service Opportunities
Contracts to Be Let
Contracts Wanted
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Desk Room Wanted
Educational
Employment Agencies
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Industrial Sites
Labor Bureaus
Machine Shops
Machinery Wanted
New Industries Wanted
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Patent Attorneys
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Positions Vacant
Positions Wanted
Property for Sale
Proposals
Receivers' Sales
Representatives Wanted
Salesmen Want Connections
Salesmen Wanted
Second Hand Equipment
  For Sale   For Rent
  Exchange   Wanted
Specialties
Tutoring
Vacation Work Wanted
Water Front Property
Work Wanted
Miscellaneous for Sale
  for Rent or Want Ads.

Can we serve you?

0150

FOR SALE

ONE STREET SPRINKLER

Length over bumpers—27 ft. 9 in.
Capacity, 4500 gallons.
Trucks, Brill 27 G. I., 14 ft. Wheel Base, 33 in.—450 lb. Chilled Wheels, 4½ in. Axle, 69 tooth gear, 17 tooth pinion.
Motors, 4 General Electric 80's.
Controllers, 2 General Electric K-28, double end operation.
Brakes, Hand and Air, C. P. 27 Air Compressor.
Complete, ready for service, in good operating condition.

FARE REGISTERS

100—International Type R-5, with B-3 back, in first class condition.

ONE STREET SPRINKLER

Length over bumpers, 19 ft.
Capacity, 2800 gallons.
Trucks, single, 21-G, 8 ft. 0 in. wheel base, 33 in., 450 lb. Chilled Wheels, 4½ in. Axle, 69 tooth gear, 17 tooth pinion.
Motors, 2 General Electric 70.
Controllers, 2 General Electric K-11 double end operation.
Brakes, Magnetic and Hand Brakes.
In good condition, ready for service.

RAILWAY MOTORS

6—General Electric 66, form B, 75 solid tooth gear, bore 5.74 in., 19 tooth pinion, complete with cast steel gear cases, 5¾ in. axles, A-1 operating condition.

Very low prices to move above equipment quickly.

GRAND RAPIDS RAILWAY COMPANY
Grand Rapids, Michigan

SOME ONE WANTS TO BUY

the equipment or machinery that you are not using. This may be occupying valuable space, collecting dust, rust and hard knocks in your shops and yards.

SELL IT BEFORE DEPRECIATION SCRAPS IT

THE SEARCHLIGHT SECTION IS HELPING OTHERS
—*LET IT HELP YOU ALSO*

0079

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Air Aftercoolers
Chicago Pneumatic Tool Co.
Ingersoll-Rand Co.

Air Receivers
Chicago Pneumatic Tool Co.
Ingersoll-Rand Co.

Anchors, Guy
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Angle Bars
Lackawanna Steel Co.

Automobiles and Buses
Brill Co., The J. G.

Axles
Bemis Car Truck Co.
Carnegie Steel Co.
St. Louis Car Co.

Axles, Car Wheel
Bemis Car Truck Co.
Brill Co., The J. G.
Standard Steel Works Co.
Westinghouse Elec. & Mfg. Co.

Axle Straighteners
Columbia M. W. & M. I. Co.

Babbitt Metal
More-Jones Brass & Metal Co.

Babbitting Devices
Columbia M. W. & M. I. Co.

Badges and Buttons
Electric Service Supplies Co.
International Register Co., The

Batteries, Storage
Electric Storage Battery Co.

Bearings Roller & Ball
Gurney Ball Bearing Co.

Bearings and Bearing Metals
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
General Electric Co.
More-Jones Brass & Metal Co.
St. Louis Car Co.
Westinghouse Elec. & Mfg. Co.

Bearings, Center and Roller Side
Stucki Co., A.

Bearings, Oilless, Graphite, Bronze and Wood
Bound Brook Oil-less Bearing Co.

Bells and Gongs
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
St. Louis Car Co.

Benders, Rail
Niles-Bement-Pond Co.

Boilers
Babcock & Wilcox Co.

Boiler Tubes
National Tube Co.

Bond Testers
American Steel & Wire Co.

Bonding Apparatus
American Steel & Wire Co.
Electric Ry. Improvement Co.
Electric Service Supplies Co.
Ohio Brass Co.

Bonds, Rail
American Steel & Wire Co.
Copper Clad Steel Co.
Electric Ry. Improvement Co.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Boring Tools, Car Wheel
Niles-Bement-Pond Co.

Boxes—Junction & Outlet
National Metal Molding Co.

Brackets and Cross Arms (See also Poles, Ties, Posts, Etc.)
Bates Expanded Steel Truss Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

Brake Adjusters
National Ry. Appliance Co.
Westinghouse Traction Brake Co.

Brake Shoes
Amer. Brake Shoe & Fdry. Co.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

Brakes, Brake Systems and Brake Parts
Ackley Brake & Supply Corp.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
National Brake Co.
Safety Car Devices Co.
St. Louis Car Co.
Westinghouse Traction Brake Co.

Brooms, Track, Steel or Rattan
Zelnicker, W. A., Supply Co., Inc.

Brushes, Carbon
Corliss Carbon Co.
General Electric Co.
Jeandron, W. J.
Morganite Brush Co., Inc.
United States Graphite Co.
Westinghouse Elec. & Mfg. Co.

Brush Holders
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.

Bushings
National Metal Molding Co.

Bushings, Case Hardened and Manganese
Bemis Car Truck Co.
Brill Co., J. G., The

Bushings, Graphite and Wooden
Bound Brook Oilless Bearing Co.

Cables (See Wires and Cables)

Cambric Tapes, Yellow and Black
Irvington Varnish & Insulator Co.

Cambric, Yellow and Black Varnished
Irvington Varnish & Insulator Co.

Carbon Brushes (See Brushes, Carbon)

Car Panel Safety Switches
Westinghouse Elec. & Mfg. Co.

Cars, Dump
Differential Car Co.

Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
Kuhlman Car Co., G. C.
McGuire-Cummings Mfg. Co.
National Ry. Appliance Co.
St. Louis Car Co.
Wason Mfg. Co.

Cars, Second Hand
Electric Equipment Co.

Cars, Self-Propelled
Electric Storage Battery Co.
General Electric Co.

Castings, Brass, Composition or Copper
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.
More-Jones Brass & Metal Co.

Castings, Gray Iron and Steel
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Standard Steel Works Co.
St. Louis Car Co.

Castings, Malleable and Brass
Amer. Brake Shoe & Fdry. Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

Catchers and Retrievers, Trolley
Ackley Brake & Supply Corp.
Electric Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.

Circuit Breakers
Automatic Reclosing Circuit Breaker Co.
Cutter Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Clamps and Connectors for Wires and Cables
Anderson Mfg. Co., A. & J. M.
Electric Railway Equipment Co.
Electric Service Supplies Co.
General Electric Co
Hubbard & Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Cleaners and Scrapers—Track (See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
Ohio Brass Co.

Cleats
National Metal Molding Co.

Clusters and Sockets
General Electric Co.

Coal and Ash Handling (See Conveying and Hoisting Machinery)

Coil Banding and Winding Machines
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

Coils, Armature and Field
Cleveland Armature Works
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Coils, Choke and Kicking
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Coin-Counting Machines
Electric Service Supplies Co.
International Register Co., The
Johnson Fare Box Co.

Commutator Slotters
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Commutator Truing Devices
General Electric Co.

Commutators or Parts
Cameron Electrical Mfg. Co.
Cleveland Armature Works
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Compressors, Air
Chicago Pneumatic Tool Co.
General Electric Co.
Ingersoll-Rand Co.
Westinghouse Trac. Brake Co.

Compressors, Gas
Ingersoll-Rand Co.

Condenser Papers
Irvington Varnish & Insulator Co.

Condensers
General Electric Co.
Schutte & Koerting Co.
Westinghouse Elec. & Mfg. Co.

Conduit Fittings
Chicago Fuse Mfg. Co.

Conduits Interior
National Metal Molding Co.

Connectors, Solderless
Frankel Connector Co.
Westinghouse Elec. & Mfg Co.

Controller Fingers
Russell Mfg. Co.

Controllers or Parts
Columbia M. W. & M. I. Co.
General Electric Co.
Russell Mfg. Co.
Westinghouse Elec. & Mfg. Co.

Controller Regulators
Elec. Service Supplies Co.

Controlling Systems
General Electric Co.
Westinghouse Elec. & Mfg. Co

Converters, Rotary
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Conveying and Hoisting Machinery
Columbia M. W. & M. I. Co.

Copper Wire
Anaconda Copper Mining Co.
Copper Clad Steel Co.

Cord, Bell, Trolley, Register, etc.
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Roebling's Sons Co., John A.
Samson Cordage Works
Silver Lake Co.

Cord Connectors and Couplers
Electric Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car
Brill Co., The J. G.
Ohio Brass Co.
Westinghouse Trac. Brake Co.

Cranes
Niles-Bement-Pond Co.
Whiting Corp.

Cross Arms (See Brackets)

Crossing Foundations
International Steel Tie Co.

Crossing Signals (See Signals, Crossing)

Crossings, Frog and Switch
Wharton, Jr., & Co., Wm.

Crossings, Track (See Track, Special Work)

Culverts
Canton Culvert & Silo Co.

Curtains and Curtain Fixtures
Brill Co., The J. G.
Electric Service Supplies Co
St. Louis Car Co.

Cutouts
Chicago Fuse Mfg Co.

Dealers' Machinery
Archer & Baldwin
Electric Equipment Co.
Foster Co., L. B.
Hyman Michaels Co.

Derailing Devices (See also Track Work)
Wharton, Jr., & Co., Wm.

Destination Signs
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

Detective Service
Wish Service, P. Edward

Dogs, Lathe
Williams & Co., J. H.

Door Operating Devices
Consolidated Car Heating Co.
National Pneumatic Co., Inc.
Safety Car Devices Co.

Doors and Door Fixtures
Brill Co., The J. G.
General Electric Co.

Doors, Folding Vestibule
National Pneumatic Co., Inc

Draft Rigging (See Couplers)

Drills, Rock
Chicago Pneumatic Tool Co.
Ingersoll-Rand Co.

Drills, Track
American Steel & Wire Co.
Chicago Pneumatic Tool Co.
Electric Service Supplies Co.
Niles-Bement-Pond Co.
Ohio Brass Co.

Drinking Cups, Sanitary Paper
Individual Drinking Cup Co., Inc.

Dryers, Sand
Electric Service Supplies Co.
Zelnicker Supply Co., Inc., Walter A.

Electrical Wires and Cables
American Steel & Wire Co.
Roebling's Sons Co., J. A.

Electric Tools
Chicago Pneumatic Tool Co.

Engineers, Consulting, Contracting and Operating
Allison & Co., J. E.
Archbold-Brady Co.
Arnold Co. The
Byllesby & Co., H. M.
Clark & Co., Mgr., Corp., E. W.
Day & Zimmermann
Feustel, Robert M.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Englehardt W
Horton, Barker & Wheeler
Jacobs & Co., J. L.
Jackson, Walter
Kelly, Cooke & Co.
Parsons, Klapp, Brinkerhoff & Douglas
Republic Engineers, Inc.
Richey, Albert S
Sanderson & Porter
Stone & Webster
White Engineering Corp., The J. G.

Engines, Gas, Oil or Steam
Chicago Pneumatic Tool Co.
Ingersoll-Rand Co.
Westinghouse Elec. & Mfg. Co.

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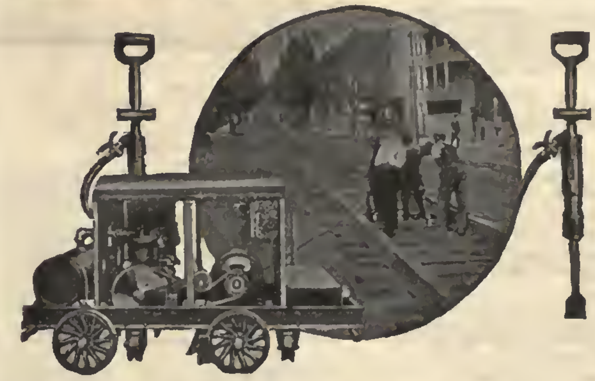

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Schutte & Koerting Co.

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American Steel & Wire Co.

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Brill Co., The J. G.
Cleveland Fare Box Co.
Consolidated Car Fender Co.
Electric Service Supplies Co.

Fibre and Fibre Tubing
Continental Fibre Co.
Westinghouse Elec. & Mfg. Co.

Field Coils (See Coils)

Filters, Water
Scaife & Sons Co., Wm. B.

Floodlights
Electric Service Supplies Co.

Flooring Composition
American Mason Safety Tread Co.

Forgings
Carnegie Steel Co.
Columbia M. W. & M. I. Co.
Standard Steel Works Co.
Williams & Co., J. H.

Foundry Equipment
Whiting Corp.

Frogs, Track (See Track Work)

Funnel Castings
Wharton, Jr., & Co., Inc., Wm.

Fuses and Fuse Boxes
Chicago Fuse Mfg. Co.
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.
Williams & Co., J. H.

Fuses, Refillable
Chicago Fuse Mfg. Co.
Columbia M. W. & M. I. Co.
General Electric Co.

Gages, Oil and Water
Ohio Brass Co.

Gaskets
Power Specialty Co.
Westinghouse Traction Brake Co.

Gas-Electric Cars
General Electric Co.

Gas Producers
Westinghouse Elec. & Mfg. Co.

Gates, Car
Brill Co., The J. G.

Gear Blanks
Carnegie Steel Co.
Standard Steel Works Co.

Gear Cases
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Westinghouse Elec. & Mfg. Co.

Gears and Pinions
Ackley Brake & Supply Corp.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
National Railway Appliance Co.
Nuttall Co., R. D.
Tool Steel Gear & Pinion Co.

Generating Sets, Gas-Electric
General Electric Co.

Generators
General Electric
Westinghouse Elec. & Mfg. Co.

Gongs (See Bells and Gongs)

Graphite
Morganite Brush Co., Inc.

Grates, Chain
Green Eng. Co.

Greases (See Lubricants)

Grinders and Grinding Supplies
Chicago Pneumatic Tool Co.
Metal & Thermit Corp.
Railway Track-work Co.

Grinding Blocks and Wheels
Railway Track-work Co.

Guards, Trolley
Electric Service Supplies Co.
Ohio Brass Co.

Harps, Trolley
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
More-Jones B. & M. Co.
Nuttall Co., R. D.
Star Brass Works

Headlights
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
St. Louis Car Co.

Heaters, Car (Electric)
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
National Ry. Appliance Co.
Smith Heater Co., Peter.

Heaters, Car, Hot Air and Water
Cooper Heater Co.
Smith Heater Co. Peter

Heaters, Car (Stove)
Electric Service Supplies Co.
Smith Heater Co., Peter

Hoists and Lifts
Chicago Pneumatic Tool Co.
Columbia M. W. & M. I. Co.
Ford-Chain Block Co.
Niles-Bement-Pond Co.
Whiting Corp.

Hose
Chicago Pneumatic Tool Co.
Ingersoll-Rand Co.

Hose, Bridges
Ohio Brass Co.

Hydraulic Machinery
Niles-Bement-Pond Co.

Injectors
Schutte & Koerting Co.

Inspection
Electrical Testing Lab's

Instruments, Measuring, Testing and Recording
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Insulating Cloth, Paper and Tape
General Electric Co.
Standard Underground Cable Co.
Westinghouse Elec. & Mfg. Co.

Insulating Materials, China & Porcelain
Jeffrey-Dewitt Insulator Co.

Insulating Varnishes
Irvington Varnish & Insulator Co.

Insulation (See also Paints)
Anderson Mfg. Co., A. & J. M.
Electric Ry. Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Insulators, China, Porcelain & Composition
Jeffrey-Dewitt Insulator Co.

Insulators (See also Line Material)
Anderson Mfg. Co., A. & J. M.
Drew Electric & Mfg. Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Insulator Pins
Electric Service Supplies Co.
Hubbard & Co.

Insulators, Section
Flood City Mfg. Co.

Jacks (See also Cranes, Hoists and Lifts)
Buckeye Jack Mfg. Co.
Columbia M. W. & M. I. Co.

Joints, Rail
Carnegie Steel Co.
Lackawanna Steel Co.
Rail Joint Co.
Zelnicker Supply Company, Inc., Walter A.

Junction Boxes
Standard Underground Cable Co.

Journal Boxes
Bemis Car Truck Co.
Brill Co., J. G.

Lamp Guards and Fixtures
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Lamps, Arc and Incandescent (See also Headlights)
Anderson Mfg. Co., A. & J M
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Lamps, Signal and Marker
Ohio Brass Co.

Lathe Attachments
Williams & Co., J. H.

Lathes, Car Wheel
Niles-Bement-Pond Co.

Lightning Protection
Anderson Mfg. Co., A. & J. M
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Line Material (See also Brackets, Insulators, Wires, etc.)
Anderson Mfg. Co., A. & J. M.
Archbold-Brady Co.
Columbia M. W. & M. I. Co
Drew Electric & Mfg. Co.
Electric Railway Equipment Co.
Electric Service Supplies Co
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Loaders, Wagon, Truck or Car
Portable Machinery Co.

Locking Spring Boxes
Wharton, Jr., & Co., Wm.

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General Electric Co.
McGuire-Cummings Mfg. Co.
Westinghouse Elec. & Mfg. Co.

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Galena-Signal Oil Co.
Texas Co.

Lubricants, Oil and Grease
Galena-Signal Oil Co.
Texas Co.

Machine Tools
Columbia M. W. & M. I. Co.
Niles-Bement-Pond Co.

Machine Work
Columbia M. W. & M. I. Co.

Magnet Wire
Belden Mfg. Co.

Manganese Steel Castings
Wharton, Jr., & Co., Wm.

Manganese Steel Special Track Work
Wharton, Jr., & Co., Wm.

Meters (See Instruments)
Electric Service Supplies Co.

Mirrors for Motormen
Drew Elec. & Mfg. Co.

Molded Insulations & Parts
Belden Mfg. Co.

Molding Metal
National Metal Molding Co.

Money Changers
Galef, J. L.

Motormen's Seats
Brill Co., J. G., The
Electric Service Supplies Co.
Wood Co., Chas. N.

Motors, Electric
Westinghouse Elec. & Mfg. Co.

Motors and Generators, Sets
General Electric Co.

Nuts and Bolts
Barbour-Stockwell Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Hubbard & Co.
Lackawanna Steel Co.

Oil Burning Equipment
Schutte & Koerting Co.

Oils (See Lubricants)

Packing
Westinghouse Elec. & Mfg. Co.

Paints and Varnishes (Preservative)
Ackley Brake & Supply Corp.

Paints and Varnishes for Woodwork
National Ry. Appliance Co.

Paving Blocks
Northern Granite & Stone Co.

Paving Material
American Brake Shoe & Fdry Co.
Northern Granite & Stone Co.

Pickups, Trolley Wire
Electric Service Supplies Co
Ohio Brass Co.

Pinion Pullers
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co
Wood Co., Chas. N.

Pinions (See Gears)

Pins, Case Hardened, Wood and Iron
Bemis Car Truck Co.
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse Traction Brake Co.

Pipe
National Tube Co.

Pipe Fittings
Power Specialty Co.
Standard Steel Works Co.
Westinghouse Traction Brake Co.

Planers (See Machine Tools)

Pliers, Insulated
Electric Service Supplies Co.

Plugs
National Metal Molding Co.

Pneumatic Tools
Chicago Pneumatic Tool Co.
Ingersoll-Rand Co.

Pole Reinforcing
Hubbard & Co.

Poles, Metal Street
Bates Expanded Steel Truss Co.
Electric Railway Equipment Co.
Hubbard & Co.

Pole Sleeves
Drew Elec. & Mfg. Co.

Poles, Ties, Post, Piling and Lumber
Bennett-Field Cross Tie Co.
Duncan Lumber Co.
Page & Hill Co.
Southern Cypress Mfgrs. Assn.

Poles, Trolley
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
National Tube Co.
Nuttall Co., R. D.

Poles, Tubular Steel
Electric Railway Equipment Co
National Tube Co.

Poles and Ties Treated
Bennett-Field Cross Tie Co.
Duncan Lumber Co.
Page & Hill Co.

Power Saving Devices
National Ry. Appliance Co.

Pressure Regulators
General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Pumps
Schutte & Koerting Co.

Punches, Ticket
Bonney-Vehslage Tool Co.
International Register Co., The
Wood Co., Chas. N.

Purifiers, Feed Water
Scaife & Sons Co., Wm. B.

Rails
Carnegie Steel Co.
Foster Co., L. B.
Lackawanna Steel Co.

Rail Grinders (See Grinders)

Rail Joint Plates
Lackawanna Steel Co.

Rails, Relaying
Foster Co., L. B.
Zelnicker, Walter A., Supply Co., Inc.

Railway Safety Switches
Westinghouse Elec. & Mfg. Co.

Rattan
Brill Co., The J. G.
Electric Service Supplies Co.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.

Registers and Fittings
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Rooke Automatic Register Co.

Reinforcement, Concrete
American Steel & Wire Co.
Carnegie Steel Co.
Lackawanna Steel Co.

Repair Shop Appliances (See also Coil Banding and Winding Machines)
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

Repair Work (See also Coils)
Cleveland Armature Works
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Replacers, Car
Columbia M. W. & M. I. Co.
Electric Service Supplies Co

Resistance, Grid
Columbia M. W. & M. I. Co.

Resistance, Wire and Tube
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Retrievers, Trolley (See Catchers and Retrievers, Trolley)

Rheostats
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Rosettes
National Metal Molding Co.

Rubber Covered (Wire and Cables)
Belden Mfg. Co.

Sanders, Track
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Ohio Brass Co.
St. Louis Car Co

Sash Fixtures, Car
Brill Co., The J. G

Scrapers, Track (See Cleaners and Scrapers, Track)

Sealing Material
Brill Co., J. G., The

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Cleveland Armature Works
Hyman Michaels Co.
Zelnicker Supply Co., Inc., Walter A.

Shades, Vestibule
Brill Co., The J. G

Shovels
Brill Co., The J. G.
Hubbard & Co.

Signals, Car Starting
Consolidated Car Heating Co.
Electric Service Supplies Co.
National Pneumatic Co., Inc.

Signal Systems, Block
Electric Service Supplies Co.
Nachod Signal Co., Inc.
U S. Electric Signal Co.
Wood Co., Chas. N.

Signal Systems, Highway Crossing
Nachod Signal Co., Inc.
U. S. Electric Signal Co.

Slack Adjusters (See Brake Adjusters)

Slag
Carnegie Steel Co.

Sleet Wheels and Cutters
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Drew Electric & Mfg. Co.
Electric Railway Equipment Co.
More-Jones Brass & Metal Co.
Nuttall Co., R. D.

Snow-Plows, Sweepers and Brooms
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Consolidated Car Fender Co.
McGuire-Cummings Mfg. Co.

Sockets & Receptacles
National Metal Molding Co.

Solderless Connectors
Frankel Connector Co.

Special Adhesive Papers
Irvington Varnish & Insulator Co.

Speed Recorders, Locomotive & Car
Chicago Pneumatic Tool Co.

Spike Drivers, Portable Electric (Screw Spikes)
Chicago Pneumatic Tool Co.

Spikes
American Steel & Wire Co
Lackawanna Steel Co.

Splicing Compounds
Westinghouse Elec. & Mfg. Co.

Splicing Sleeves (See Clamps and Connectors)

Spray Nozzles
Schutte & Koerting Co.

Springs, Car and Truck
American Steel & Wire Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Fort Pitt Spring & Mfg. Co.
Standard Steel Works Co.

Sprinklers, Track and Road
Brill Co., The J. G.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.

Steel Castings
Wharton, Jr., & Co., Wm.

Steps, Car
American Mason Safety Tread Co.

Tubing, Steel
National Tube Co.

Stokers, Mechanical
Babcock & Wilcox Co.
Westinghouse Elec. & Mfg. Co.

Storage Batteries (See Batteries, Storage)

Strand
Copper Clad Steel Co.
Roebling's Sons Co., J. A.

Structural Steel
Lackawanna Steel Co.

Superheaters
Babcock & Wilcox Co.
Power Specialty Co.

Sweepers, Snow (See Snow Plows, Sweepers and Brooms)

Switch Stands
Ramapo Iron Works

Switches, Track (See Track Special Work)

Switchboxes
Chicago Fuse Mfg. Co.

Switches and Switchboards
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Tampers, Tie
Ingersoll-Rand Co.

Tapes and Cloths (See Insulating Cloth, Paper and Tape)

Telephones and Parts
Electric Service Supplies Co.

Terminals, Cable
Standard Underground Cable Co.

Testing, Commercial and Electrical
Elec'l Testing Laboratories

Testing Instruments (See Instruments, Electrical Measuring, Testing, etc.)

Thermostats
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Railway Utility Co.
Smith Heater Co., Peter

Ticket Choppers and Destroyers
Electric Service Supplies Co.

Tie Plates
Lackawanna Steel Co.

Ties, Mechanical
Dayton Mechanical Tie Co.

Ties and Tie Rods, Steel
Barbour-Stockwell Co.
Carnegie Steel Co.
International Steel Tie Co.

Ties, Wood Cross (See Poles, Ties, Posts, etc.)

Tongue Switches
Wharton, Jr., & Co., Wm.

Tool Holders
Williams & Co., J. H.

Tool Steel
Carnegie Steel Co.

Tools, Thread Cutting
Chicago Pneumatic Tool Co.
Williams & Co., J. H.

Tools, Track and Miscellaneous
American Steel & Wire Co
Chicago Pneumatic Tool Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Hubbard & Co.
Railway Track-work Co.

Towers and Transmission Structures
Archbold-Brady Co.
Bates Expanded Steel Truss Co.
Westinghouse Elec. & Mfg. Co.

Track Bolts and Spikes
Lackawanna Steel Co.

Track Expansion Joints
Wharton, Jr., & Co., Wm.

Track, Special Work
Barbour-Stockwell Co.
Columbia M. W. & M. I. Co.
Engel & Hevenor
New York Switch & Crossing Co.
Ramapo Iron Works
St. Louis Frog & Switch Co.
Wharton, Jr., & Co., Inc., Wm.

Transfer Tables
Archbold-Brady Co.

Transfer Issuing Machines
Shanklin Equipment Co.

Transformers
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Treads, Safety, Stair, Car Step
American Mason Safety Tread Co.

Trolley Bases
Ackley Brake & Supply Corp.
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Nuttall Co., R. D.
Ohio Brass Co.

Trolley Material, Overhead
Flood City Mfg. Co.

Trolley Bases, Retrieving
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Nuttall Co., R. D.
Ohio Brass Co.

Trolleys and Trolley Systems
Ford Chain Block Co.

Trolley Wheel Bushings
Flood City Mfg. Co.

Trolley Wheels (See Wheels, Trolley)

Trolley Wheels and Harps
Flood City Mfg. Co.

Trolley Wire
American Steel & Wire Co.
Anaconda Copper Mining Co.
Copper Clad Steel Co.
Roebling's Sons Co., John A.

Trucks, Car
Bemis Car Truck Co.
Brill Co., The J. G.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.

Tubing, Yellow and Black Flexible Varnished
Irvington Varnish & Insulator Co.

Turbines, Steam
General Electric Co.
Terry Steam Turbine Co.
Westinghouse Elec. & Mfg. Co.

Turnstiles
Perey Mfg. Co., Inc.

Valves
Ohio Brass Co.
Schutte & Koerting Co.
Westinghouse Traction Brake Co

Varnished Papers
Irvington Varnish & Insulator Co.

Varnished Silks
Irvington Varnish & Insulator Co.

Vending Machines, Drinking Cup
Individual Drinking Cup Co., Inc.

Ventilators, Car
Brill Co., The J. G.
National Railway Appliance Co.
Railway Utility Co.
St. Louis Car Co.

Vises, Pipe
Williams & Co., J. H.

Washers
Bound Brook Oil-less Bearing Co.

Water Softening & Purifying Systems
Scaife & Sons Co., Wm. B.

Welders, Portable Electric
Electric Ry. Improvement Co.

Welding Processes and Apparatus
Electric Ry. Improvement Co.
General Electric Co.
Metal & Thermit Corp.
Westinghouse Elec. & Mfg. Co.

Wheel Guards (See Fenders and Wheel Guards)

Wheel Presses (See Machine Tools)

Wheels, Car, Cast Iron
Bemis Car Truck Co
Griffin Wheel Co.

Wheels, Car, Steel and Steel Tired
Carnegie Steel Co.
Bemis Car Truck Co.
Standard Steel Works Co.

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Anderson Mfg. Co., A. & J. M.
Bound Brook Oil-less Bearing Co.
Columbia M. W. & M. I. Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
General Electric Co.
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Whistles, Air
General Electric Co.
Ohio Brass Co.
Westinghouse Traction Brake Co.

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Copper Clad Steel Co.
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with reversible and renewable tips
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Employment Equipment Business Opportunities
613

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Sole Manufacturers
"HONEYCOMB" AND "ROUND JET" VENTILATORS
for Monitor and Arch Roof Cars, and all classes of buildings;
also ELECTRIC THERMOMETER CONTROL
of Car Temperatures.
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Rail Bonds and Trolley Line Specialties
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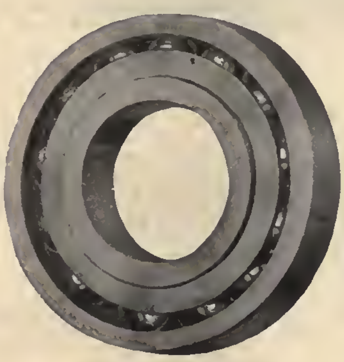

Lower Power Consumption—
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Increase Efficiency

In these days, when the difference between income and outgo is so small, ball bearings under your cars would help turn the pointer in the right direction. Cars so equipped run with less friction, start easier, coast further, and require less labor for upkeep.

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Conrad Patent Licensee
JAMESTOWN, N. Y.

GURNEY
BALL BEARINGS

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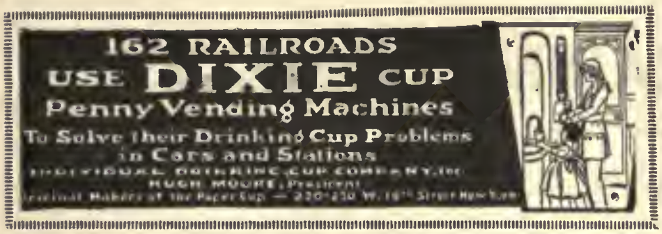

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To Solve their Drinking Cup Problems
in Cars and Stations
INDIVIDUAL DRINKING CUP COMPANY, Inc.
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KARBOLITH CAR FLOORING—For steel cars; is sanitary, light weight, fire proof, non-slippery.
STANWOOD STEPS—Self-cleaning, non-slippery, light.
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AMERICAN MASON SAFETY TREAD CO., Lowell, Mass
Branch Offices: Boston, New York City, Philadelphia
Agencies in all principal cities
Joseph T. Ryerson & Son, General Western Distributors.

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Car Heating and Ventilation

is one of the winter problems that you must settle without delay. We can show you how to take care of both, with one equipment. Now is the time to get your cars ready for next winter. Write for details.

The Peter Smith Heater Company
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National Metal Molding Co.
PITTSBURGH, PA.

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General Offices and Works: Harvey, Ill.
CRANES OF ALL TYPES
FOUNDRIES EQUIPPED COMPLETE

Collier Service

Co-operation with the Advertiser is also Co-operation with You

There are a dozen ways to skimp on the quality car-card publicity if we wanted to skimp—as in design, grade of paper and ink, frequency of change, timeliness of subject advertised, merchandise data, so on.

But the fact that Collier Service cars are notable for the large proportion of experienced national advertisers proves that these advertisers realize that they are getting real co-operation in selling their product.

Because of this co-operation their confidence in car-card advertising has remained undiminished despite the enormous development of other forms of advertising since Collier Service was originated.

That is where our co-operation with *you* comes in—for it is the advertiser's confidence in Collier Service that keeps car-card advertising a source of permanent revenue to the electric railway.

Barron G. Collier
INCORPORATED
Candler Building, New York

COLUMBIA

At the point of contact take no chances

Maximum conductivity and grooves that minimize arcing are predominant features of Columbia Trolley Wheels.

Supplied in three sizes, 4¼ in., 5 in. and 6 in., they cover the range of overhead demands from the lightest safety car to heaviest interurban. Hub lengths and bushing diameters are made to suit any harp or spindle. Unless otherwise specified, all Columbia Wheels are supplied with oilless bushings, which insure long life to spindle and wheel.

The price is not the least point in our favor. Trial orders and repeat orders will receive equally prompt attention.

The Columbia Machine Works & Malleable Iron Company
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ERNEST KELLER, Brooklyn, N. Y.
E. ALLISON THORNWELL, 1026-7 Atlantic Trust Bldg., Atlanta, Ga.
J. L. WHITTAKER, 141 Milk St., Boston, Mass.
F. F. BODLER, 903 Monadnock Bldg., San Francisco, Calif.
W. McK. WHITE, 343 South Dearborn St., Chicago, Ill.

TOOLS

- Armature and axle straighteners
- Armature shaft straighteners
- Armature buggies and stands
- Babbitting molds
- Banding and heading machines
- Car Hoists
- Car Replacers
- Coil taping machines for armature leads
- Coil winding machines
- Pinion pullers
- Pit jacks
- Signal or target switches
- Tension stands

CAR EQUIPMENT

- Armature and axle bearings
- Armature and field coils
- Bearings (axle and armature)
- Brush-holders and brush-holder springs
- Brake, door and other handles
- Brake forgings, rigging, etc.
- Car trimmings
- Commutators
- Controller handles
- Forgings of all kinds
- Gear cases (steel or malleable iron)
- Grid resisters
- Third-rail shoe beams and accessories
- Trolley poles (steel) and wheels

The Place For Birney Safety Cars

Another Place for Birney Safety Cars
OWL SERVICE

No type of car previously developed meets the requirements of the "after midnight" travel as successfully as the Birney Safety Car.

During the "wee small hours" of the morning when patrons are homeward bound a more frequent schedule can also be operated at less total expense than any service with the heavier two-man cars.

Eliminate the long waiting for a night car by the installation of a more frequent Birney Safety Car Service. It is not only more economical, but will go far toward improved public relations.

Memo

Number of Birney Safety Cars Ordered

OVER

2800

THE J. G. BRILL COMPANY

PHILADELPHIA, PA.

AMERICAN CAR CO. — G. C. KUHLMAN CAR CO. — WASON MANF'G CO.
ST. LOUIS MO. CLEVELAND, OHIO. SPRINGFIELD, MASS.

The building of machinery to secure greater motor power within the same car space is an accomplishment of exceptional importance in electric railroading.

G-E 247 Ventilated Motor

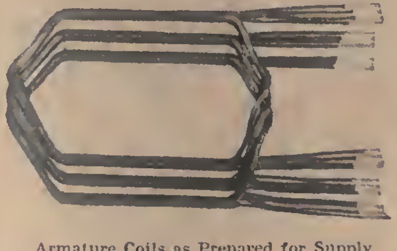
Make Your Present Cars Do More Work

Commutating poles and self-ventilation were not unknown to the earliest inventors of electric railway motors. But it was not until General Electric Company engineering was asked to meet the severe conditions encountered in congested city service that these principles were converted into successful practice.

These two improvements incorporated in the modern ventilated commutating pole motor produces higher output per pound of weight.

Field Coils and Pole Pieces as Supplied When Ordered from Catalogue.

G-E 203P Ventilated Motor.



Armature Coils as Prepared for Supply Shipments.

General Electric Company

General Office
Schenectady, N.Y.

Sales Offices in
all large cities

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SHANKLIN TRANSFER ISSUING MACHINE

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We have some remarkable figures of actual performances we'll be glad to send you on request.

Shanklin Equipment Co., Inc.
Springfield, Mass.

Westinghouse

HL CONTROL

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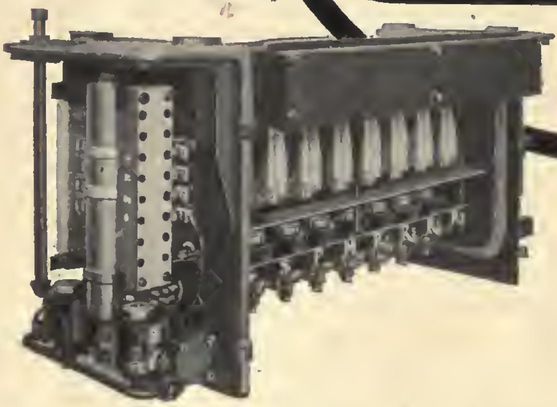

HL Control Box, complete with covers on.

H L Control Facts

Hand operation permits economic acceleration under any of the continuously varying conditions on surface lines.

Simplicity, accessibility and interchangeability of all active parts reduce every phase of H L maintenance to a minimum.

Eleven Years of superior service have made H L control a universal standard.

Westinghouse Electric & Manufacturing Co.
East Pittsburgh, Pa.

Vol. 57, No. 8 New York, February 19, 1921 Pages 341-390

Electric Railway Journal

Henry W. Blake and Harold V. Bozell, Editors

Henry H. Norris, Managing-Editor

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Westinghouse
Surface Condensers

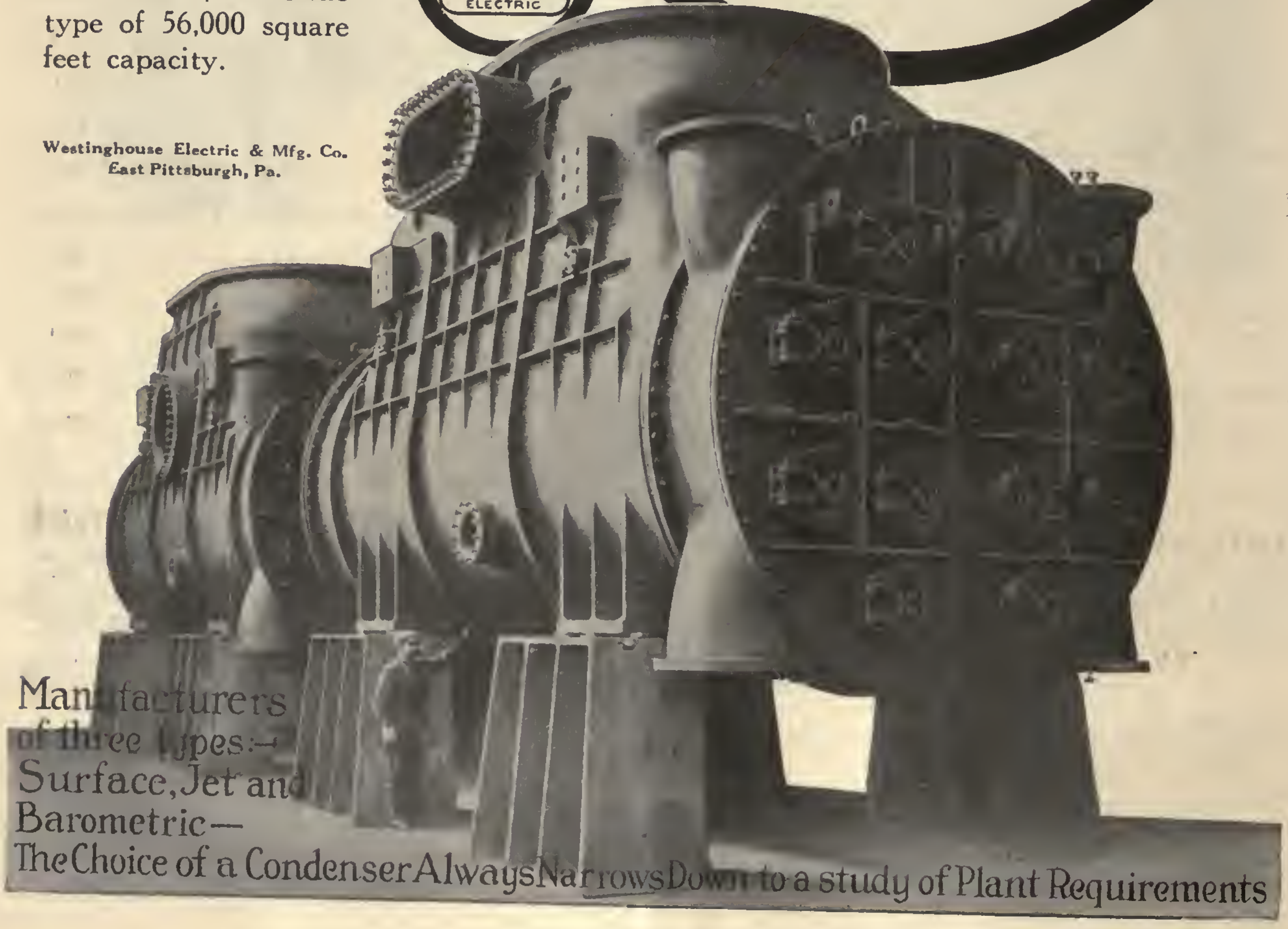
The Divided Water Box provides additional operating refinements

Clean one-half of the condenser while the other half continues to maintain vacuum on the turbine.

The first three divided water box condensers of 30,000 sq. ft. capacity were designed by Westinghouse engineers in 1913. They were installed by the Havana Electric Railway Company, who later ordered two more of the same type of 56,000 square feet capacity.

Westinghouse Electric & Mfg. Co.
East Pittsburgh, Pa.

WESTINGHOUSE ELECTRIC



Manufacturers
of three types:—
Surface, Jet and
Barometric—
The Choice of a Condenser Always Narrows Down to a study of Plant Requirements

Embracing the Entire Field

BRAKES
FOR
EVERY
CLASS
OF
SERVICE

Westinghouse Traction Brakes are not limited to a single class of service. They cover the field in its entirety.

STRAIGHT Air Brake for ordinary low-speed city service.

Straight Air Brake with Emergency Feature for single motor cars, or two-car (motor and trailer) train in city and suburban service where moderate speeds prevail.

Quick Recharge, Quick Service, Graduated Release, Straight Air Feature, High Pressure in Emergency, Automatic Brake for electric trains of two to five cars for suburban and interurban high-speed service.

Quick Action, Quick Recharge, Quick Service, Graduated Release, Automatic Brake for trains of five to ten cars in high-speed electric railway service.

Electro-Pneumatic, Instant and Simultaneous Action, High-Pressure in Emergency, Automatic Brake for multiple-unit elevated, subway and high-speed electric surface lines; also for electrified divisions of steam railways.

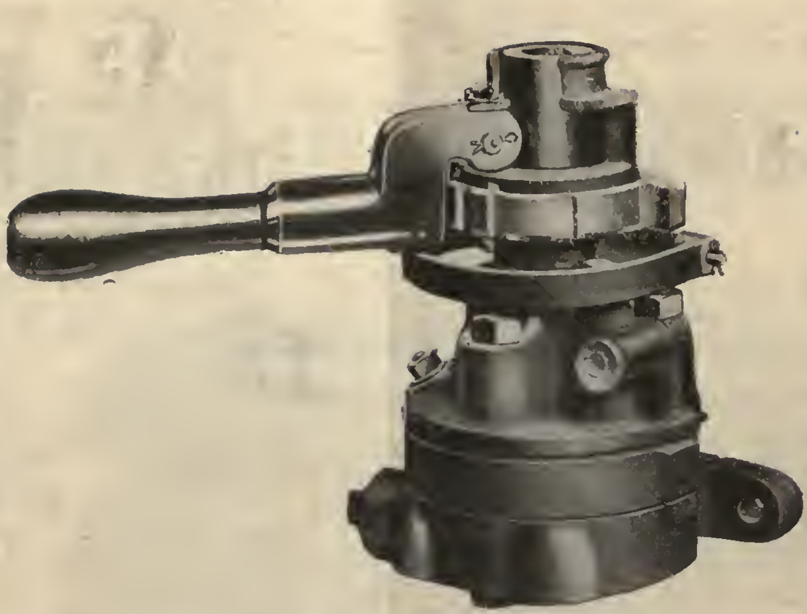
Variable-Load Brake for all heavy electric railway service where uniform stopping distances are essential.

Westinghouse Traction Brake Company

General Office and Works: Wilmerding, Pa.

"Fourteen Miles East of Pittsburgh"

New York San Francisco
Washington Pittsburgh
Chicago St. Louis



AIR BRAKE and SAFETY CAR CONTROL EQUIPMENT

"How can we give the public better service and at the same time reduce our operating costs?"

That's a question that's being asked in a good many localities by a good many more or less worried electric railway executives.

Down in Houston, Texas, they've answered the question—definitely and satisfactorily—in just two words. "Safety Cars." They are using forty-five of them now and the number is to be increased.

This is what A. R. Amerman, Mayor of Houston, said in a recent telegram relative to Safety Car operation:

"Satisfactory to public and operators. Forty-five in operation and preparing to install more. *Working fine.*"

What the Safety Car is doing in Houston it will do anywhere. But remember—it is a Safety Car only when equipped with automatic laborless apparatus, so interlocked that, regardless of the illness or distraction of the operator, the power will be cut off instantaneously, the air brakes and sander apply immediately thereafter and the doors unlock for safe and easy exit. Furthermore, it is a Safety Car only when the doors must be closed before the car can start, and when the air brake must be applied before the doors are opened and the step lowered in bringing the car to a service stop.

SAFETY CAR DEVICES COMPANY

Main Office—Boatmen's Bank Bldg., ST. LOUIS, MO.

CHICAGO
Railway Exchange Bldg.

WASHINGTON, D. C.
Munsey Bldg.

NEW YORK
City Investment Bldg.

PITTSBURGH
Westinghouse Bldg.

SAN FRANCISCO
Southern Pacific Bldg.

CANADA—Canadian Westinghouse Co., Ltd., Hamilton, Ont.

A BUFFER OF SAFETY BEFORE YOUR CARS-

When danger looms up at night the motorman must see in time and he must be alert and ready to act.

Imperial Luminous Arc Headlights project a brilliant beam of light far down the track—even when voltage drops.

The motorman can pick up obstructions in plenty of time without eye strain. He is ready for the emergency when it comes.

Highway traffic is effectively warned of the car's approach by Imperial's powerful light.

For speed with safety at night—Imperial Luminous Arcs.

THE OHIO BRASS COMPANY
Mansfield, Ohio

NEW YORK
PHILADELPHIA
PITTSBURGH
CHICAGO

MEMBER AMERICAN ELECTRIC RAILWAY ASSOCIATION AERA 1921

LOS ANGELES
SAN FRANCISCO
PARIS, FRANCE

Exclusive Sales Agents in the U. S. for Crouse-Hinds Imperial Headlights

Phono-Electric

at an important Tacoma Junction

This location in front of the Post Office at Tacoma was one of the great intersections during war times, for it was here that the masses of shipyard workers transferred to the Municipal Railway.

Through the use of Phono-Electric Trolley Wire at this and other busy points, there was assured a higher reliability of power supply service than would have been possible if dependence had been placed on copper.

PHONO-ELECTRIC is as Reliable in Peace as in War.

Bridgeport Brass Company

Bridgeport 2227 **Connecticut**

Keystone Steel Gear Cases

"Riveted for Strength—Reinforced by Spot Welding"

Made in standard forms for practically all modern types of railway motors.

By experience it has been found that a rivet is strong in one direction and a spot weld in exactly the opposite — against slipping.

To secure the strongest possible construction Keystone cases are riveted and welded. Soft, open-hearth, special analysis steel of extra quality is used in the construction of these cases and breakage or tearing out of the sides is practically unknown.

Brackets are either steel or malleable iron castings or steel forgings and the manufacturing process and design of these cases insure maximum strength and service.

***There is a lot more about them—
Write for data sheets***

ELECTRIC SERVICE SUPPLIES CO.

Manufacturer of Railway Material and Electrical Supplies

PHILADELPHIA
17th and Cambria Streets

NEW YORK
50 Church Street

CHICAGO
Monadnock Building

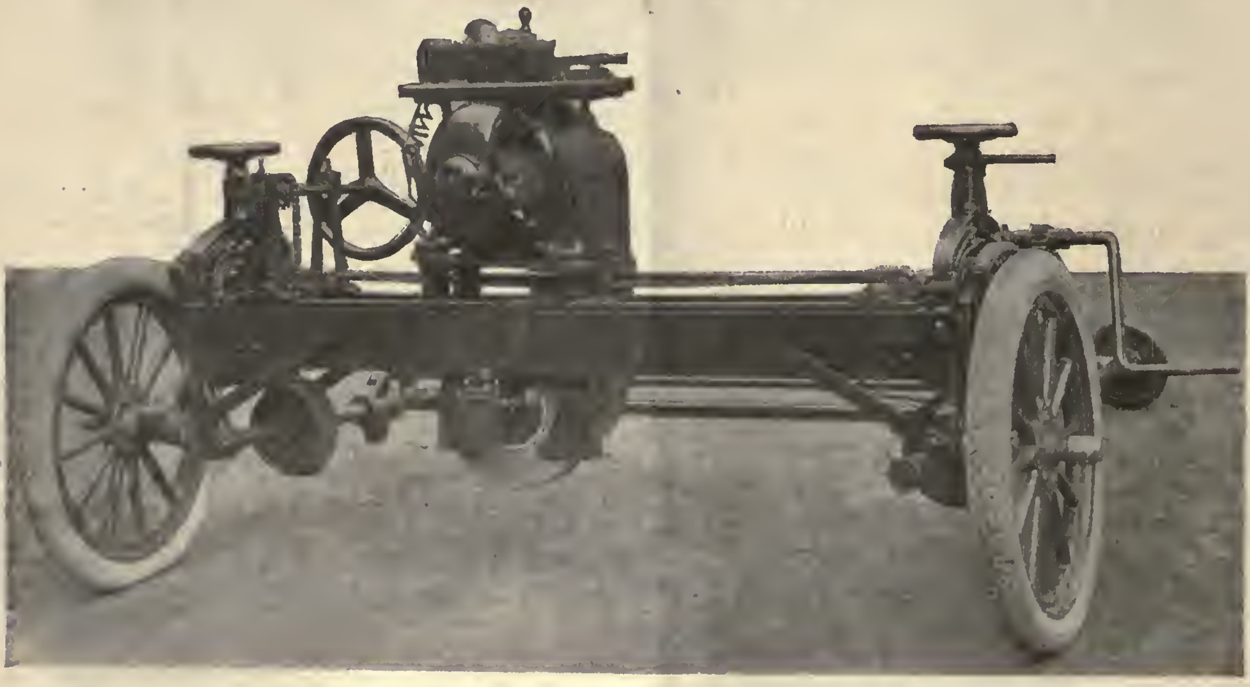
Seven Features of

UNIVERSAL

ROTARY TRACK GRINDERS

1. Large Pneumatic Derail Wheels
2. Outboard Bearing on the Grinding Wheel Arbor
3. A Grinding Wheel that may be tilted to meet any angle of the rail head
4. Adjustable Outrigger
5. Easy adjustment of all parts
6. Easy operation
7. Low working economy

We also make the "Atlas Rail Grinder" and "Reciprocating Track Grinder"



RAILWAY TRACK-WORK CO.

3132-48 East Thompson St., Philadelphia, Pa.

Exclusive Agents:

ATLAS RAILWAY SUPPLY CO.
Chicago, Ill.

ELECTRICAL ENGINEERING & MANUFACTURING CO
Pittsburgh, Pa.

Exclusive Agents:

CHAS. N. WOOD CO.
Boston, Mass.

HITCHCOCK, LLOYD & CO., Inc.
77A Queen Victoria St., E. C.
London, England

Chicago's two-car train with new trailer and remodeled motor car

Standardize! *Pneumatize!*

Chicago Surface Lines Start Train Operation Right

When the Chicago Surface Lines decided that the time for train operation was ripe, they realized that pneumatized cars were a necessity if the utmost in schedule speed and track capacity was to be attained.

And so the management ordered the installation on the first fifty trailers of National Pneumatic Door Control and Safety Interlocking Door Control toward the ideal of securing two (or more) cars with but a single thought.

And that thought being to carry safely the largest number of passengers in the shortest possible time.

Make your peak periods produce maximum profit and efficiency

National Pneumatic Company, Inc.
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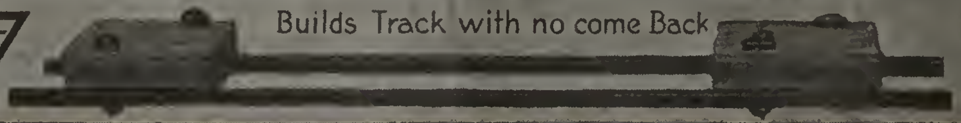
Works: Rahway, N. J.

Manufactured in Canada By
Dominion
Wheel & Foundries, Ltd.,
Toronto, Ont.

The RESILIENT RAILWAY TIE



Builds Track with no come Back

DMT Co DMT Co

Is your track investment a long time security or a short time demand note

Concrete and long life are synonymous *if* proper safeguards are placed around the concrete. Protected against a hammer blow concrete will last indefinitely; unprotected it will crumble up and pass on.

The *Resiliency* in the Dayton Tie absorbs the hammer blow and is the security for a long life to track built in concrete.

Write us for detailed information and be prepared to make your track investment a long time security.

THE DAYTON MECHANICAL TIE CO., 704 COMMERCIAL BUILDING, DAYTON, OHIO

To Save Power at the Car—
—To Save Labor at the Car House

Sacramento Northern *orders* ECONOMY METERS

Economy Power-Saving Meters tell you—without trouble

1. WHO are your careful, economical motormen.
2. WHICH motormen need instruction in proper handling of car equipment.
3. HOW much power is being saved by motormen collectively and individually, by direct reading units of power.
4. HOW much power is being used on any section of your lines.
5. HOW much power is being used in trailer service.
6. HOW much power your freight and express service is using.
7. HOW much power is being used for switching and car movements in yards.
8. WHAT is the line loss on your D.C. distribution.
9. WHEN your schedule speeds are too high or too low.
10. WHAT is the most economical equipment for any service.
11. WHAT are the proper gear ratios for given service conditions.
12. WHEN each car should be inspected.

Economy Meters with inspection dials have been ordered for the high speed passenger cars operating the 200 miles of third rail track of the Sacramento Northern Railroad.

This is another one of the long list of notable electric railways to adopt the Economy Meter, now Standard on more than 60 roads.

Economy Meters are rugged, time-tried devices

Any "Power Saving Device" will induce energy savings but only the Economy Meter will get the maximum saving with no hazard to passengers or equipment. The Economy Meter gives the only actual check on how much energy is consumed per man or per car. The records from Economy Meters actually show a motorman whether he has saved power—and how much. No other devices do this.

There is no mystery about Power Saving with Economy Meters

The ECONOMY "Power-Saving" and Car Inspection Meter provides a means to accurately and automatically show when a car is due for inspection. It also shows at a glance how much more work a car can do before inspection is needed, or, in case of a road failure, how much work the car has done previous to the failure. All this is had without any clerical labor.

The records from Economy Meters are of high value for managerial and engineering purposes.

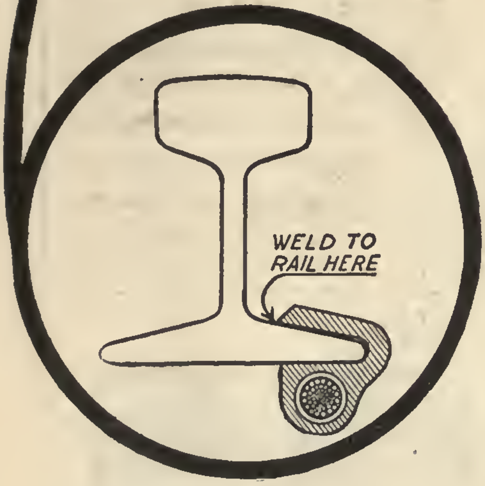
Meter the energy—that's what you want to save

Economy Electric Devices Company
L. E. GOULD, Pres.
Old Colony Bldg., Chicago
Cable Address: Sangamo, Chicago

National Railway Appliance Co., New York
L. A. Nott, San Francisco

Burton R. Stare Co., Seattle
J. G. Monahan, Los Angeles

Ludwig Hommel & Co., Pittsburgh
Grayson Railway Supply Co., St. Louis



Cut Down the Coal Bills

by reducing power losses with Flood City Everlast railbonds. Low Voltage is unknown where these rail bonds are used.

Motor flashovers, bad commutators and low speed are often traced to a poor rail circuit.

Everlast rail bonds guarantee you a perfect rail circuit because:

1. The copper cable and its connecting sockets are located beneath the base of the rail and are thus protected from injury.
2. The sockets are protected from the arc during the process of welding.
3. The steel terminals fit tightly over the rail flange; and hold themselves firmly in position while being welded.
4. For temporary work the terminals need only be welded along their upper edge. They can then readily be cut loose and used a number of times again.
5. The method of securing the copper cable to the steel terminals assures maximum durability and conductivity.

Complete details an request

Flood City Mfg. Co.
Johnstown, Pa.

Everlast

Railbonds that do Just That—

The RWB Dynamotor at Work

Welding joints under traffic by means of the Lincoln Carbon Arc Process.

An efficient and economical method which insures a joint of strength and conductivity equal to the rail.

Reduces maintenance expense by making the joints last as long as the rest of the track.

Is used extensively by Street Railways both small and large.

Just as good for old track as new.

Do all Shop and track welding and bonding with the same

RWB Dynamotor

It pays for itself.

Rail Welding and Bonding Company

Formerly The Lincoln Bonding Co.

RWB

Cleveland, Ohio.

New York Office:
30 Church Street
Chicago Office:
343 So. Dearborn St.

London Representative:
Electrical Apparatus Export Corporation, 408-9 Bank Chambers—High Holborn

The men who handle the nickels and dimes

Your conductors—the men who collect and turn over to you the revenue that keeps your property on a paying basis—is it fair to hold them accountable for fare collection if you fail to supply them with some means of making a positive and accurate check on all receipts?

Without such a check on fares it is difficult to place responsibility for loss of revenue; it's hard to keep the honest conductor and it's almost impossible to get rid of the dishonest one.

With Johnson Fare Boxes every fare collected is instantly and accurately recorded. The Johnson Fare Box receives and registers nickels, dimes, pennies and 2 sizes of metal tickets. These are points which insure maximum fare collection and a resultant increase in gross revenue of from 3 to 10%.

Any of the more than 200 Electric Railways equipped with Johnson Fare Boxes will gladly verify this. Write to them—and to us for all the facts. Our Engineering Department is at your service—without cost or obligation.

JOHNSON FARE BOX COMPANY

Ravenswood, Chicago, Ill.

SHERARDUCT

Sherardized Rigid Steel Conduit

The Incomparable Conduit

Sherarduct is specified and installed wherever electrical conduits of the highest quality are required. Its Sherardized surface—both inside and out—makes it the *one* conduit that conquers rust.

Being rust-proof and acid-proof, Sherarduct is practically everlasting. It is giving positive and permanent protection to the wiring system in the country's best and best-known buildings.

Write for Bulletins describing Sherarduct and other National Products.

National Metal Molding Co.

Fulton Bldg., Pittsburgh, Pa.

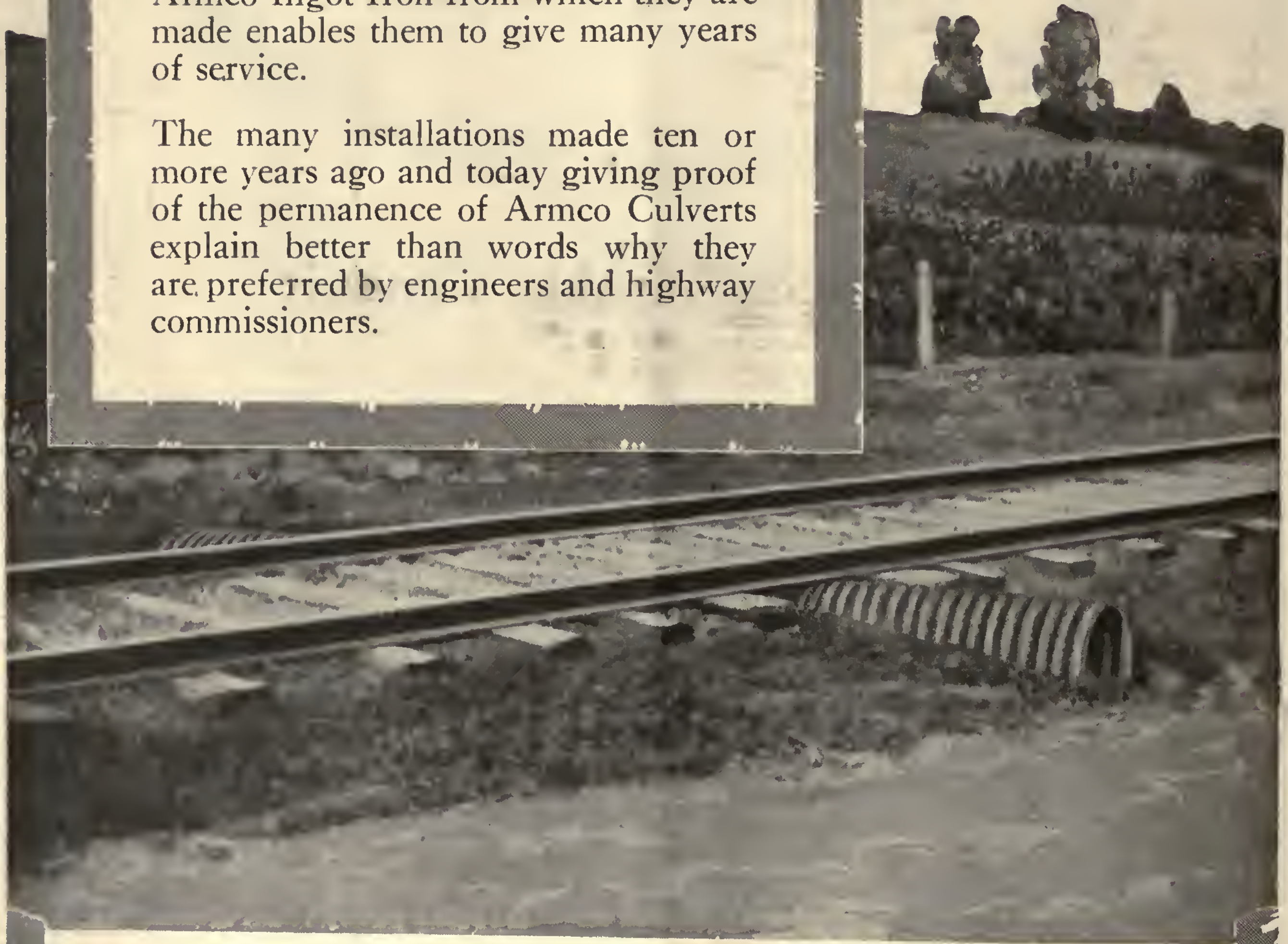
NATIONAL PRODUCTS
N M M Co

In Perfect Condition After Ten Years of Severe Service

With heavy trains rolling over it day after day and only a light fill to protect it, this Armco Culvert is in perfect condition after ten years of service.

Very often, Armco Culverts are subject to extremely severe conditions, yet their rugged construction and the purity of Armco Ingot Iron from which they are made enables them to give many years of service.

The many installations made ten or more years ago and today giving proof of the permanence of Armco Culverts explain better than words why they are preferred by engineers and highway commissioners.



TRADE MARK ARMCO Resists Rust Ingot Iron

There is a manufacturer in nearly every state, and in Canada, making genuine rust-resisting ARMCO CULVERTS and other products of American Ingot Iron such as flumes, siphons, tanks, road signs, roofing, etc. Write for full information and nearest shipping point on products in which you are interested.

ARMCO CULVERT & FLUME MFRS. ASSN.
215 NORTH MICHIGAN AVE. CHICAGO

Track Economy

TEN years ago, in paved street track construction, a careful compromise was necessary between the first cost and the quality of the job.

Since then, in the building of Steel Twin Tie Track, many properties have made startling economies in first cost over conventional types of construction.

We will be glad to put at your disposal figures that have convinced others.

THE INTERNATIONAL STEEL TIE CO.
CLEVELAND, O.

Steel Twin Tie Track

What is the Least Appropriation You can Get Along With for That New Track?

STEEL Twin Tie Track designs help you answer that question with the minimum figure.

Moreover, the track you will build will be more permanent and smoother riding.

Estimates, actual cost experiences, and designs furnished when you desire.

THE INTERNATIONAL STEEL TIE CO.
CLEVELAND, O.

DU PONT FABRIKOID

Thousands of coaches are now upholstered with Fabrikoid

BECAUSE Fabrikoid is *comfortable*—it is soft, pliant and flexible. Travelers appreciate this upholstery.

Because Fabrikoid is *sanitary*. It is absolutely impervious to dust and dirt. It is not stained by liquids, greases or perspiration. And just soap and water clean it in a jiffy.

Because Fabrikoid *wears*. It outlasts most seat coverings. Perspiration will not rot it. Careless passengers do not harm it—it is scuff-proof. It is built to give service—and it does just that—stands up under the hardest usage.

Fabrikoid upholstery is thoroughly economical. When it is applied, it's on to stay for many years. It is the easiest upholstery to care for and keep up. Let us send you full information and samples of Fabrikoid. It is made in a wide variety of grains and colors. It will pay you to investigate.

E. I. du Pont de Nemours & Co., Inc.
***Sales Department:* Fabrikoid Division**
Wilmington, Delaware

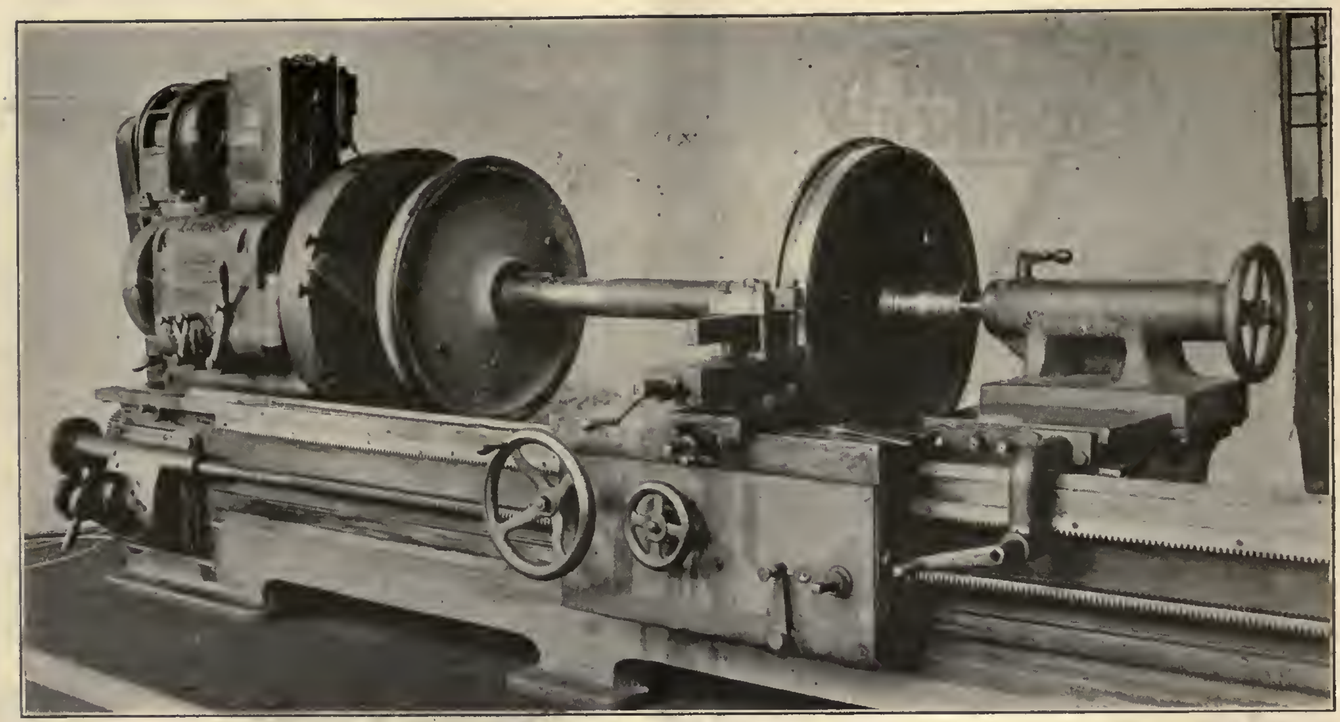
Branch Offices:

Harvey Building	Boston, Mass.
McCormick Building	Chicago, Ill.
Gugle Building	Columbus, Ohio
Dime Bank Building	Detroit, Mich.
Merchants Bank Building	Indianapolis, Ind.
21 East 40th Street	New York City
Chronicle Building	San Francisco, Cal.

Plant: Newburgh, N. Y.

Fabrikoid—the result of a process adding beauty and long life to fabrics; some heavy and rugged, others dainty as linen—all pliable, scuff-proof, stain-proof and water-proof.

FABRIKOID



Showng the McCabe "All-in-One" Lathe 24/40-in. swing in operation at the Atlantic City Convention

A McCabe "All-in-One" Lathe Sells At Half the Cost of a Wheel Lathe

For Your Wheel Work—

No machine will answer better than the "All-in-One." Ample swing, rigidity of bed and carriage, sufficient power, correct cutting speeds and accuracy of adjustment insure the requisite qualities for wheel truing of the finest workmanship and to the closest gage tolerances.

And the significance of that statement is simply this:—

When you need a wheel lathe badly, you hesitate about getting such a specialized machine because you know full well that it won't be kept busy all the time.

And then, too, by such a purchase, you haven't gone one step further toward the handling of your other work such as motor bearings, commutators, axles and the various repair jobs, large and small, that require a greater range of capacities, feeds and speeds.

Why not install the lathe whose range and flexibility of operation allow all work to be handled with the same ease that characterizes it when doing wheel-lathe work?

The many users of "All-in-One" Lathes are killing more than the proverbial two birds by this method because their outlay is only 50% of the cost of doing it the other way while their return is much more than *twofold.*

J. J. McCabe Lathe & Machinery Corp.

149 Broadway, New York City

Know Instantly— what the motorman ahead is doing!

What does the motorman—what does the chauffeur say—in self defense after a rear end accident? "How did I know he was going to stop so quick?" —or "My car coasted into his—I couldn't help it!" or "If I'd only *known* passengers were going to get off . . . ," etc., etc.

Nichols-Lintern Indicating Signals wipe those conditions off the map. They take the blindfold off the motorman and let him know—*instantly*—just what is being done. They tell him when to start and stop—when to coast—when to apply the brakes without making false moves that wear out motors, brakes and trucks.

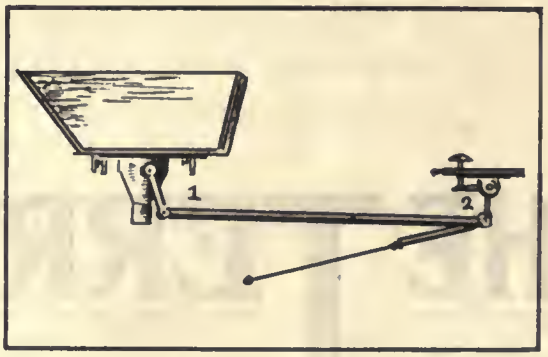
Write us. Let us show you how you can eliminate rear-end collisions. Let us tell you about this ESSENTIAL equipment for Safety Cars.

Know—Instantly— that the SAND will STOP the Car!

"The AIR failed me—and I couldn't stop the car!" says the motorman—that is, until he gets a car with the N-L Mechanical Sander.

Loss of air on a Safety Car can easily happen—then the car isn't safe. But if the car is equipped with N-L Mechanical Sanders, he can apply the sand—*just enough sand, without waste*—by a slight foot pressure at the instant he applies his hand brake.

N-L Mechanical Sanders, in short, supply all the sand you need *when* you need it—but without waste. Their use means *absolute protection*. Full details on request. Write us.

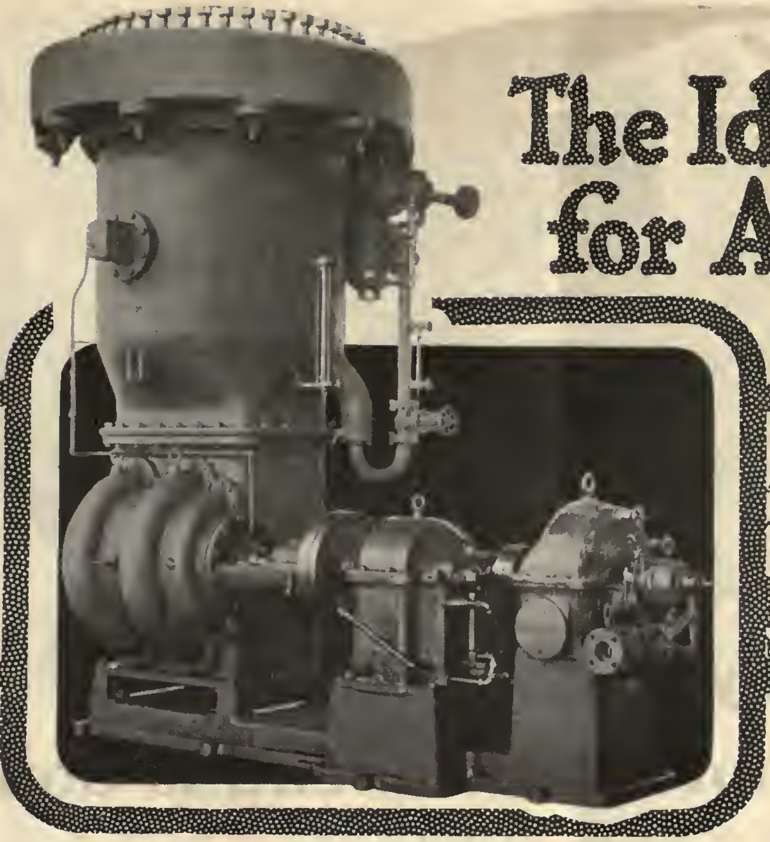


Here is all there is to it for the Safety Car—rapidly and cheaply installed.

The Nichols-Lintern Co.

8404 Lorain Avenue, Cleveland, Ohio

The Ideal Drive for Auxiliaries



FOR auxiliary drive dependability of operation is of paramount importance. Where dependability can be obtained without sacrificing economy the ideal conditions are met. Dependability depends upon the source of energy, simplicity of mechanical construction and accessibility of wearing parts. Terry turbines receive their energy directly from the boiler, avoiding the cycle of main unit, generator, fuses, switchboard and wiring required by motors.

The Terry turbine is fundamentally the simplest form of prime mover, as it contains but a single, one-piece wheel. Terry split case construction permits easy access to the interior for inspection or repairs without disturbing the alignment or the steam or exhaust connections. That Terry conforms to the demands of economy is shown by their extensive application to condensers of all types, boiler feed pumps and exciters in practically all the highly efficient plants in the country.

For the drive which is right,

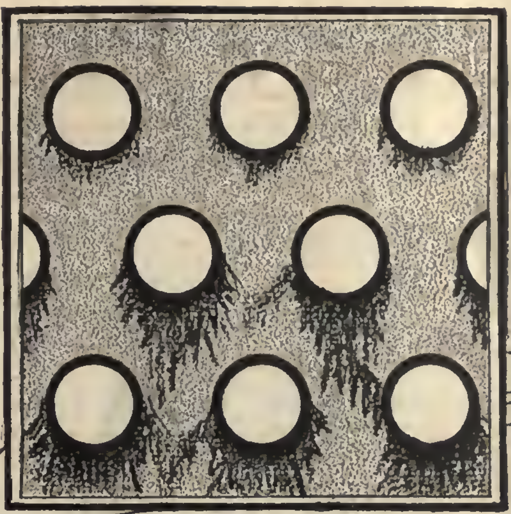
Specify

T-732

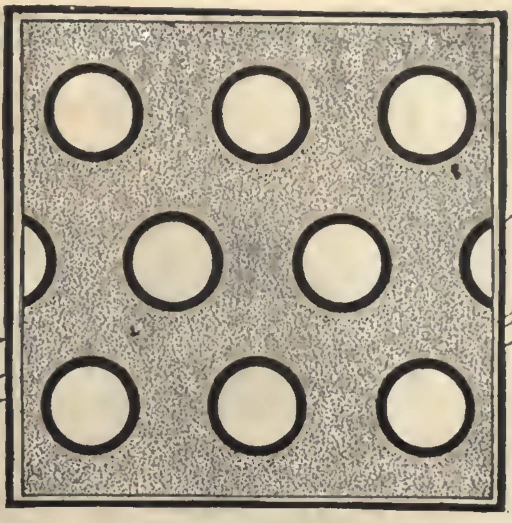
THE TERRY TURBINE

Offices in Principal Cities
in U.S.A. also in Important
Industrial Foreign Countries

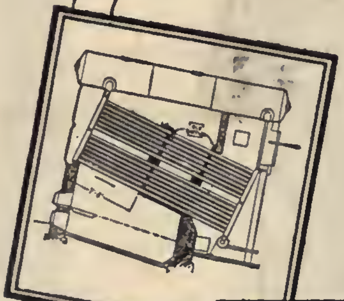
The Terry Steam Turbine Co.
Terry Sq. Hartford, Conn. U.S.A.



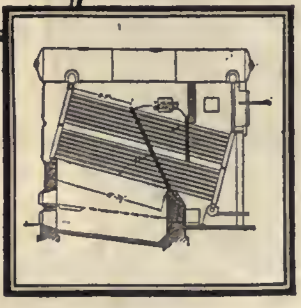
Once a week the draft restrictions got serious. Slag was removed every Sunday



Now the tubes keep free and clear a whole month. Accumulations are cleaned off every fourth week



The old baffle that caused the slag accumulations



Turner Baffles widened the entrance to the first pass, lowered gas velocity and decreased slag accumulations

How the Every Sunday Job Was Cut to Once a Month

And one more plant is saving fuel With Turner Baffle Walls

TURNER Baffles did a real good turn at the plant of a big Public Utility Company. Formerly the crew spent every Sunday cleaning slag from the boiler tubes. Now they clean but one Sunday in every month—half a day.

The men are happier and their Sunday recreation is showing in their work.

Equally important: draft restrictions are few and far between, heat absorption and steaming capacity have been greatly increased—fuel costs cut accordingly.

The old baffles were replaced without disturbing a brick of the boiler setting. Turner Baffle Walls, because they can be built at any angle to meet the design requirements of the individual boiler, are correcting almost every boiler trouble known. Positively gas tight they permit the easy replacement of tubes—straight, bent or blistered — without injury to the wall.

You should know about Turner Baffle Walls. "The Development of an Idea" describes them and points the way for a bankable saving on your fuel bills.

Send for this book today.

How to Retube Without Injury to the Baffles.

When the tubes cool they shrink away from the plastic material in the Turner Baffle Wall. This permits easy withdrawal and replacement without damage to the wall.

The Engineer Company

17 Battery Place New York City

ATLANTA
Trust Co. of Georgia Bldg

BOSTON
10 High Street

CHICAGO
1414 S. Michigan Ave.

CLEVELAND
515 National City Bldg.

DETROIT
4610 Woodward Ave.

INDIANAPOLIS
316 Indiana Trust Bldg.

ST. LOUIS
Railway Exchange Bldg.

MILWAUKEE
614 Security Bldg.

MINNEAPOLIS
Builders' Exchange Bldg.

MONTREAL
Coristine Building

WILKES-BARRE, PA.
21 Bennett Building

NEW ORLEANS
847 Baronne Street

PHILADELPHIA
1010 Harrison Building

PITTSBURGH
Jenkins Arcade Building

For the Railway Plant

S & K Oil Burning Equipment

The Koerting Mechanical Oil Burning System insures the highest practical economy in meeting modern railway loads.

VALVES
INJECTORS
CONDENSERS
SPRAY NOZZLES
CHEMICAL EQUIPMENT

SCHUTTE & KOERTING
1155 Thompson St. Philadelphia Pa.
New York Boston Pittsburgh Chicago Cleveland Denver

OIL BURNING EQUIPMENT
EVAPORATORS
DISTILLERS
OIL COOLERS
FEED WATER HEATERS

If a device will take up the tremendous recoil of a broadside of 14″ rifles—as it does in the turrets of every modern battleship—will it not absorb the reaction and mechanical shock incident to rupturing high power under short circuit conditions?

Let us explain how the Condit D-17 Oil Circuit Breaker applies resiliency to high Power Circuit Breakers.

CONDIT ELECTRICAL
MANUFACTURING CO.
South Boston, 27, Mass.

122-9

TO ARMS

A call to arms has come from every section of the country. War is to be waged on the old enemy, "DEFERRED MAINTENANCE."

The spring drive against him will be carried to a successful conclusion only if armed with modern equipment.

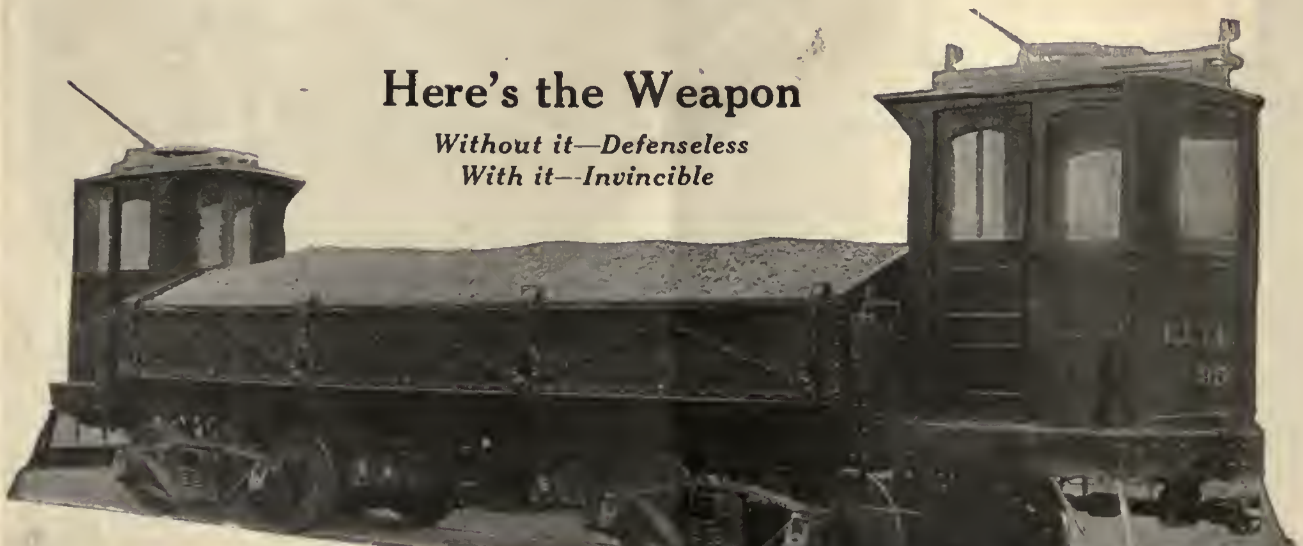
DIFFERENTIAL CARS are the most effective weapons in combat with the foe.

PREPAREDNESS—we all know the wisdom of that slogan—get them TODAY.

The enemy has no spirit to resist when faced by a battery of DIFFERENTIAL CARS. His shock troops "Excessive Costs" are routed and dismayed before them.

Here's the Weapon

Without it—Defenseless
With it—Invincible



Differential Concreting Equipment Makes Victory Secure

THE DIFFERENTIAL STEEL CAR COMPANY

H. FORT FLOWERS, *Pres. & Gen. Mgr.*
FINDLAY, OHIO

Correct lubrication means saving in the cost of brasses and babbitts

THE proper lubrication of moving parts on rolling stock is one of the most important problems of the railway official in charge of maintenance.

By proper lubrication, is meant the application of a lubricant exactly adapted to the individual requirements of the individual property in just the proper quantity. This insures correct lubrication without waste of time, material or labor.

Tulc is sold on this basis. Each property using Tulc is considered as a special problem requiring specialized treatment. The result of this policy is a marked lowering in lubricating costs—savings that amount to 40% or more over former methods. Where Tulc is used the added life of brasses and babbitts alone often pays the total lubricating bill.

If you are interested in better lubricating methods at a materially reduced cost, it will pay you to learn more about Tulc and Universal Lubricating Service. Write today and our service men will be placed at your disposal.

"Overall Specialists"

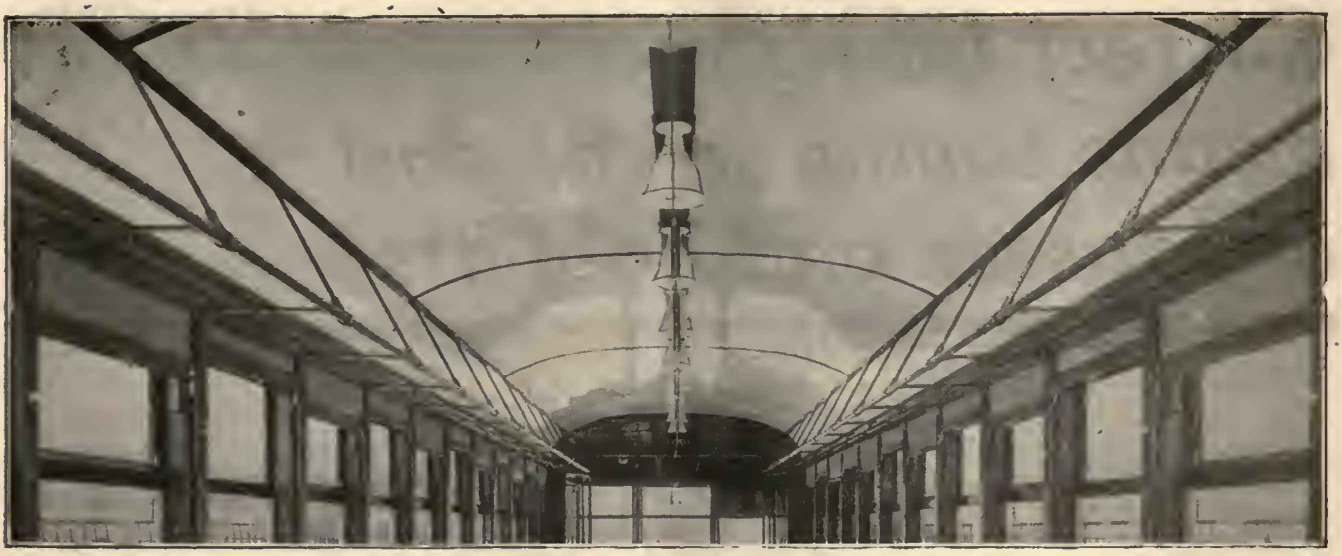
The service men who work with you on your lubricating problems are not "experts on theories." They put on overalls and get right down to brass tacks—pack your cars—*show* you how and why Tulc should be used. They get results—real money saving results—99 times out of a hundred. The hundredth time there is no charge for the service.

The Universal Lubricating Co.

Offices: Schofield Bldg.
Works: Sweeney Ave.
Cleveland, Ohio

TULC
A
LUBRICANT

—scientifically and accurately compounded to reduce lubricating costs



NEVASPLIT HEADLININGS
do more than never split

They never shrink, warp nor check.

They are waterproof and of minimum conductivity.

They make car interiors safer and more beautiful.

The smooth, even surface takes paint most readily, with pleasing results.

They mean lighter cars—lighter in weight and appearance and "illumination."

NO WONDER so many big roads use them—for instance, the 100 new cars of the Philadelphia Traction Company.

Write for Booklet and samples

The Keyes Products Company
120 Broadway, New York

Columbia Machine & Malleable Iron Co., 30 Church St., New York
National Safety Car & Equipment Co., St. Louis, Mo.
SAN FRANCISCO: Ford & Geirrine, Merchants Exchange Building

A plea for fairness

This advertisement from our 1921 series in the popular magazines, is to carry on the work initiated by the Western Electric Company in 1920, of promoting a realization of the traction companies' problems.

The advertisement asks judgment "not by the little lacks but by the bigger acts." It admits there are deficiencies, but it asks recollection by the Public when it passes judgment, of the vital services the electric railways render daily and the emergencies met by them time after time.

The request is a just one. It will be made again. The work will go on.

A. Carr Ryder
—raiser of cain and windows

A STICKING window is a law unto itself. Open when it's snowing, closed when we're stifled—glued tight, *deadlocked* against the pull of bruised tingling fingers and straining muscles. Oh! to put your foot through it! Confound the trolley company anyhow! Why don't they fix it?

This is a natural way to go on—unless we happen to think of the other—and bigger—problems which the street railway people have to wrestle with.

How to get ten extra cars at Main and Center Streets at ten minutes past five every evening—how to take care of the crowd when Caruso or the circus comes to town—how to shovel a blizzard or two off the tracks and keep things moving day and night

If the trolley company didn't ordinarily find the right answers, getting down to work would be even more of a hardship.

And in recent years this business of carrying people has meant some pretty tall figuring in the effort to make both ends meet. Many communities have seen the light and granted a higher fare to assure a better service.

If our town has not, maybe it ought. Certainly in our daily life we need good service, and if the town is to grow the street railway should grow with it.

This service may never be perfect, but what human thing is? And that man who runs down the company and all its works because he can't budge a window, ought he not mix with his blame some feeling of appreciation for the service he undeniably *is* getting—the safe journey in fair weather or foul?

In any case, let us judge our public servants on the same human basis we want to be judged ourselves, not by the little lacks but by the bigger acts.

Published in the interest of Electrical Development by an Institution that will be helped by whatever helps the Industry.

Western Electric Company

No. 22. *The mechanical perfection of each telephone instrument bearing the Western Electric name-plate is one basis for confidence in every electrical product which this Company distributes for use in office, home and factory.*

COLD!

—but not in the cars equipped with Consolidated Electric Heaters and Consolidated Thermostatic Control

Cross Seat Type Elec. Heater.

For these cars will be kept at the temperature specified, automatically because of the positive and unfailing action of Consolidated Thermostatic Control.

Why not save 30 to 60% of the excess heat, now supplied by existing graduation of heat controlled by ordinary switches, by installing Consolidated Thermostatic Control.

Full details on request—write us.

Consolidated Car-Heating Co.
Albany, New York
New York City Chicago Coaticook, Quebec

Thermostat

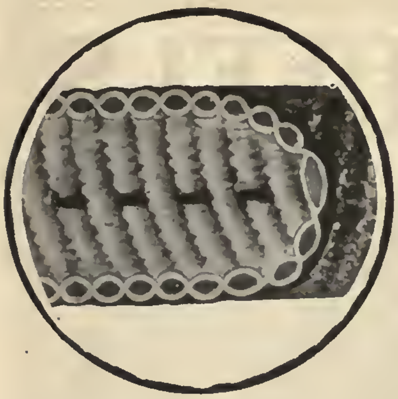
DAVIS STEEL WHEELS

Maximum Service—Minimum Maintenance Costs

Wheel removal costs and costs of turning are always supplemented by the following labor charges. (1) Cost of reapplying wheels to equipment, (2) cost of renewing or reclaiming journal brasses, (3) cost of replacing bolts and nuts every time wheels are changed, (4) cost of shimming cars to maintain coupler heights. The one-wear feature of Davis Steel Wheels eliminates all of these labor charges.

American Steel Foundries
1100 McCormick Building, Chicago

DURADUCT



Is a Non-Sweating Conduit

The man who couldn't understand why only the water in his iced whiskey appeared as moisture on the surface of the decanter, didn't know as much about condensation as many a user of metal conduit who has learned that fact through the costly medium of experience.

Duraduct, the original single-wall non-metallic conduit with the dotted line on the interior service, on thousands of cars has put an end to this trouble, and many other defects and costs that were considered a "necessary evil" with encased car wiring.

And now DURACORD

The Quality Cord

In supplementing the use of Duraduct wherever it is necessary or more convenient to combine wire, insulation and protective cover as one. Its insulation of better-than-Underwriter's rubber and its cover of the woven, non-raveling construction assures you of an exceptionally long-lived portable cord suitable for a multitude of purposes.

DURACORD is in successful and economical use in industrial plants for extension lights, portable electric tools and machines, welding outfits—in fact everywhere that portable cord receives hard usage and abuse.

Upon request we will be glad to show you by comparative samples of portable cord why Duracord can meet such a range of service.

Tubular Woven Fabric Co., Pawtucket, R. I.

New York Office: 52 Vanderbilt Ave. **Chicago Office: 549 W. Washington Blvd.**

The World's best Lubricants

"Good as Galena"

When the oil salesman declares his product is "As good as Galena"—a statement that is often made when the lubrication contract is being considered—just bear in mind these facts:

When an Electric Car Oil can deliver, pint for pint, or gallon for gallon, as great a number of car miles—

When an Electric Car Oil can produce a clinging, protective film that keeps the journal cool and smooth—

When an Electric Car Oil can show in actual service its ability to prevent that expensive evil, the "hot box"—

Then, and then only, may it justify its claim to be "as good as *Galena Electric Car Oil.*"

These are the simple, every-day tests of service that show whether car oils possess the characteristic stamina of *quality*—tests that do their own talking.

Of the hundreds of electric railways in the United States, the large majority use Galena Electric Car Oil, for the reason that no other oil has been found able to deliver such efficient and economical lubrication and also because no other oil company is equipped to render such valuable helps in attaining safe and satisfactory operation, as is offered through the medium of Galena Service.

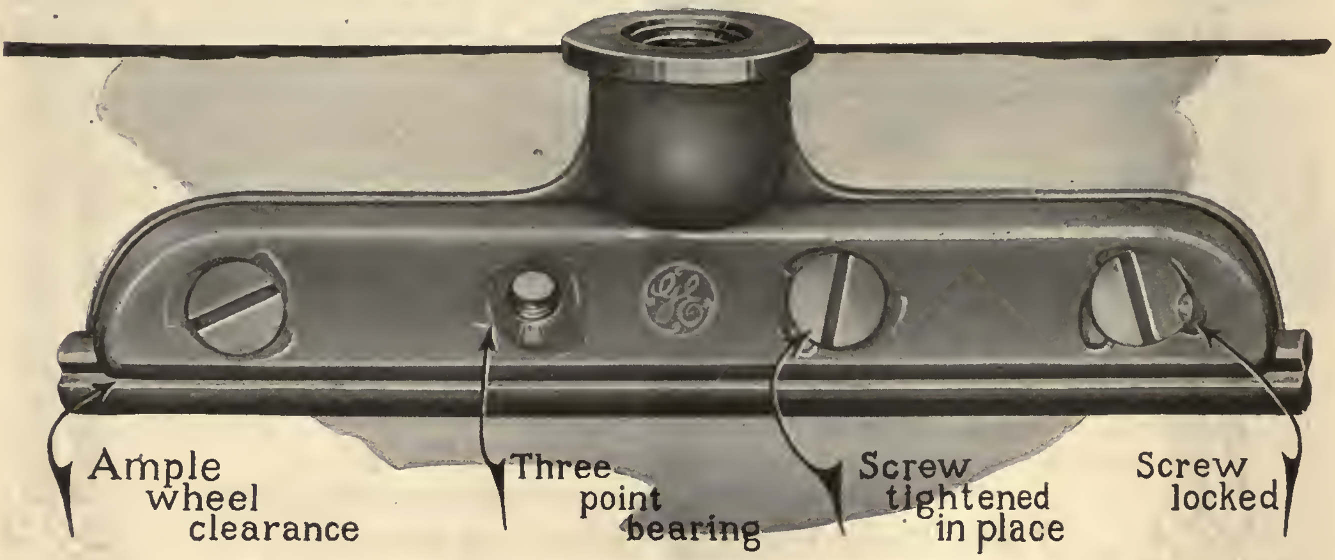
Galena Quality Is our Bond
and Your Security!

TRIGRAM G S O C TRADE MARK

THE GALENA-SIGNAL OIL CO.
NEW YORK FRANKLIN, PA. CHICAGO
Offices in all principal American Cities
LONDON BUENOS AIRES PARIS

GALENA SERVICE

Even in details of the overhead construction the degree of dependability, cost of installation and ease of replacement materially affect operating costs.



Exclusive locking feature insures dependability of Form A Clamp

Little features of design, exclusive G-E patents have placed the Form A clamp in a class by itself.

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Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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It Pays to Keep Railway Shops Looking Neat

THERE is nothing novel in the suggestion that better work is done amid orderly surroundings than in an atmosphere of slovenliness. It is worth while now and then, however, to tighten up a little on the discipline which is necessary if shops, carhouses, grounds, etc., are to be kept in presentable shape.

A visitor to an electric railway property usually wants to go out to the shops in order to find out what is actually going on. He gains a concrete idea of the general management of the property from the appearance of the shops. No matter if the front office looks like a national bank, the shop, after all, tells the real story.

But it is not the effect on visitors which is the most important, but rather the effect on the men themselves. Neat surroundings conduce to the production of good work, and to pride in that work. During the war there was some excuse for a let-down in the matter of tidiness, but now that labor conditions are becoming normal the old spirit of craftsmanship and general neatness ought to return.

A new broom and a pot of paint will accomplish wonders.

Applying an Important Factory Principle in the Shop

IN REPLY to a question as to the number of men per car maintained that he considered necessary for a properly balanced shop organization, a prominent railway engineer stated that this depends to a large extent on the shop arrangement, the shop methods used and the machinery available for making repairs. He was undeniably right. The workman is but one link in the chain of equipment maintenance. A convenient shop arrangement will do much to lessen manual labor and so to reduce the number of men needed for carrying on the work.

The present condition of most electric railway properties is such that every conceivable means should be used to increase the productive capacity of the shops and to decrease the number of men necessary for operating the various machines and for making repairs. If money is not available to purchase all of the new tools and shop machinery at once, a more efficient arrangement of the machinery already on hand is worth careful consideration. Such factors as reducing the number of times that an armature must be handled in removing it from the truck shop and placing it in position in the armature room for repairs should be studied. A slight rearrangement of shop tools so as to bring wheel presses and wheel lathes between two outside doors of a shop enabled one railway to bring wheels and axles in at one door, to carry out the various operations in mounting and turning and to deliver them when finished through the other door to a platform ready for transportation to other shops of the system. The number of times that the parts were handled and the manual labor necessary were reduced and the work was speeded up considerably. A careful study of shop layouts and shop methods will assist in providing good workmanship at low unit costs and assist in carrying the railway over the present business depression.

A Thrift Suggestion—Treat the Poles to a Preservative

SOME one has said that decay destroys 95 per cent of all wooden poles, that insects and birds eat up another 4 per cent and that mechanical forces and miscellaneous causes dispose of the remainder. If these figures and accuracy are even only distantly related, something like 4,000,000 poles each year fall victims to the fungi which cause decay. Now the Forest Service states that in something like a half century, if present pole consumption is maintained, the wooden pole will be as extinct as the dinosaur. All the more reason then that distribution engineers and railway administrators should give attention to timber preservation.

During the spring and early summer of last year poles of all kinds were difficult to obtain at any price. Inadequate transportation and unsatisfactory labor conditions back in the woods made pole stocks practically non-existent even in the big pole yards of the Northern, Middle and Far West. This condition gave us a glimpse of what the pole situation will be a generation hence with our pole timber reserves depleted. While conditions in the pole market are much better than they were a year ago, it is certainly high time now for all prospective pole buyers to be estimating their next season's requirements and making plans as to preservative treatments.

A recent investigation in the Middle West indicates that from 60 to 70 per cent of the poles now being set receive some form of treatment or other. While this seems like a fair percentage at first glance, it is altogether too small when the available supply of pole timber is taken into account. It is true that very few treated poles have been in service long enough to render accurate data on increased life available. It is also true that there are about as many kinds of preservatives and methods of treatment as the proverbial "fleas on a dog." All of which tends to the confusion of the average distribution man who is not a timber preservative expert.

While some of the prominent communication companies and utility associations have formulated standard specifications for pole treatment, the whole problem is of such recent origin it is not an assured fact that these specifications lead to the best possible results and as a whole standardized practices have not been firmly and widely established. Nevertheless it is certain that good preservatives properly applied do greatly increase pole life and, therefore, that all poles should be treated, the general principle of conservation alone being a sufficient reason. But with construction costs where they are today it is not necessary to go to the realm of ideals to "prove in" the case for preservation. When the problem is figured out in dollars and cents it is seen to be cheaper to use properly treated poles than untreated poles. This is especially true where, as is often the case, the cost of the new pole is only a fraction of the total cost of replacement. While the best practice and the best preservative may still be in the making, information which will make it possible for the average distribution man to secure good results can be found in the publications of the Forest Service and the several engineering experiment stations and timber associations. These sources of information should be utilized to the fullest extent.

The Association Passes Resolutions at the Chicago Conference

THE American Electric Railway Association is to be congratulated on its action at Chicago in adopting, without a dissenting vote, the resolutions with reference to the reports of the Federal Electric Railways Commission and of the special committee on public utilities of the Chamber of Commerce of the United States. This was the outstanding action of the midyear conference. It was the leading object which President Gadsden set out to attain at Chicago. The action of the association in this respect is an answer, or part of one, to the challenge or question outlined by Mr. Wehle in the issue of this paper for Feb. 5. For some reason there was no discussion of the resolutions on the floor of the convention; this was surprising to some, but is probably accounted for by the full discussion of the matter in the special committee and in the executive committee and also by the association members at large which took place previous to the conference.

What the association has done in this regard is to agree within itself that here is a program which will form a basis for meeting with the public. There is established a starting point for working out the details to fit the existing situations, surrounded as they are by various legal, financial, physical and social conditions of the different communities and companies. This is a first step. The industry can profit from it only in proportion as it will capitalize this united action and act in accordance therewith. A full program of publicity, local and national, must be pursued to acquaint the public with the fundamental and just bases of adjusting railway operation and stabilizing railway credit which are pointed out in these reports. The dramatic feature of this action by the railways must not be lost.

Papers Were Good, but Discussion Was Lacking

OTHERWISE, at Chicago, the association itself made no great accomplishment. This would not minimize the wonderful importance of the group of papers presented on the financial situation nor the speeches of Senator Weeks, Mr. Wilkerson and President Gadsden at the banquet in the evening. As Mr. Brady stated in his motion of appreciation to the writers of this series, the association may well be proud of these financial papers. It is to be regretted, however, that there was no open forum discussion of the many interesting topics suggested by them. Thus the thoughts or practices of men from different parts of the country on the questions of home financing, theories of valuation and forms of public aid, to mention only a few of the points brought up in the papers, would have been very helpful. The responsibility in cases of this kind is not entirely on those in charge of the program, but must be borne by the body at large. There is a certain mental inertia in an audience which needs to be overcome, either from within or without. If only some one had started a discussion in Chicago it would undoubtedly have led others to have given their experiences. Probably many attendants at the meeting left for home with the feeling: "Why didn't somebody start something by way of discussion?" forgetting possibly that they should have started the ball rolling themselves. Or if they felt some pricks of conscience, these came too late to be effective. President Gadsden's promise at the close of the Chicago meeting that there will be an active discussion at the October convention is most welcome.

As a matter of fact, the original purpose of the midyear conferences, begun in 1910, was the intimate discussion of economic and financial subjects, which could not very well be taken up during the distraction and in the bustle of the annual convention. The first midyear conferences were executive in their nature to encourage free discussion, and the only scheduled addresses were those given to stimulate remarks from the floor. The meetings have been changed from an executive to an open character, and the rule has been followed to have papers prepared on the subject under consideration. But the presentation of these papers should not monopolize all of the time, and if they are printed in advance, as they were this year, it seems hardly necessary to have them read in full. There should be a return to the original purpose of the midyear meeting, which should be a conference in fact as well as in name.

The 2-Cent Coin Would Prove Costly

ONE other action of the association was to pass a resolution, at the suggestion of T. N. McCarter and C. L. Henry, calling attention of Congress to the immense cost and inconvenience which the adoption of a 2-cent Roosevelt coin would cause the electric railways which use registering fare boxes. In the ELECTRIC RAILWAY JOURNAL for June 26, 1920, the general subject of new coins and their relation to the railways was treated editorially. There is not much to add to what was said then, except, at this time, following this action by the association, to repeat the position taken.

A 2-cent coin at present will satisfy only a sentimental demand. That it would assist any business in any way is apparently not claimed. Admirer though every one is of the great American Theodore Roosevelt, some means of commemoration other than the adoption of a new coin seems more appealing. It would work an expensive hardship on electric railways which would be always present in adding forever another element to coin registering fare boxes. There are, too, other businesses which would likewise be adversely affected wherever coin-receiving devices are used.

The association, it is gratifying to report, has received acknowledgment of receipt of the resolution by the chairman of the committee which is now considering the matter and has been assured by him that the position of the electric railways will receive due consideration.

Decasualizing Platform Labor at Boston

FROM the origin of the street railway industry to the present day an apparently insoluble labor problem has been offered by the fact that the need for platform service is more than doubled for two two-hour periods which necessarily fall within a range of twelve hours or more, if the hours are counted from the time that the cars required in peak-load transportation are taken out to the time they are returned to the carhouse. In the early days, many a company tried to solve this problem by a sort of rule-of-thumb basis rather than on a carefully planned schedule. The result was that the regulars often worked twelve to sixteen hours on the platform, while the extras got such crumbs as they could by hanging around the run board all day and most of the night. With the arrival of a fixed wage for extras and various State regulations concerning platform employment, more thought has been given to greater equalization of the work. In this way, the curse of casual labor has been reduced because the extra man is sure to earn some money every day.

In these days when wages and wage adjustments have suddenly become a very live topic, any radical departures from traditions, especially when they seem to be proving satisfactory to both employer and employee, are worth special study. For this reason it may be well to consider again the labor schedule of the Boston Elevated Railway as described by Edward Dana, general manager of the company, in the Oct. 2, 1920, issue of this paper.

The Boston Elevated Railway, to begin with, had to work out this problem within the restrictions offered by union operation, a guaranteed eight hours a day of platform service and State laws covering the over-all or elapsed period of platform hours and layoff hours. The last restriction, however, may be modified by agreement between union and company. In the ordinary course of events the older, and usually family, men would be willing to work an excessive number of hours, especially where an overtime rate applied. This would react unfavorably on the employment of the younger men from both their standpoint and that of the company; that is to say, the juniors would have fewer opportunities to earn more than minimum pay and the company would have fewer opportunities to get eight hours service per man at the rate for this class.

The management's proposal that all employees be treated as nearly alike as possible presented quite a new point of view to the employees themselves and was subjected to careful scrutiny before acceptance. In practice, however, the result has been to increase the number of employees who work the full eight hours, while the amount of time paid for but not worked to bring about eight full hours for all men is only 8.15 per cent of the total hours and the time paid as overtime amounts to less than one-half of 1 per cent of the total time. This plan has slowed down the turnover materially. The value of such stabilization of employment does not lie merely in the tangible savings that may come from cutting down overtime by the old men and undertime by the young men, but rather in the intangible benefits of the fewer accidents and greater courtesy that follow from higher morale. Finally, the union itself naturally prefers a permanent membership to one constantly changing.

Incidentally, it is interesting to note that the solution reached in Boston, *i.e.*, the increase of the load factor of the men, is the one recognized as desirable in other industries as well, though with them the variations are usually of a seasonal rather than of a daily nature. Typical cases are the clothing workers and coal miners, where efforts to introduce the same remedy, *i.e.*, to increase the average load factor as much as possible, are being made as most satisfactory for employer, employee and public.

Looking at the "Scrap Pile" from a Different Angle

IN CONNECTION with electric railway properties, the term "scrap pile" is used both metaphorically and literally, as was pointed out editorially in the issue of this paper for Jan. 15. There the principal point of view was that of the operator who desires to know when the time has arrived to confide his obsolete equipment to the limbo of the junkman's warehouse. The conclusion was that it is false economy to cling too long to antiquated rolling stock, etc.

There is another point of view from which the scrap pile can be viewed, which appeals especially to the master mechanic. To him the actual physical scrap pile has been a great source of supply during the past few years. The remarkable development of the welding art has made it possible for him to reclaim the old-fashioned junk pile almost entirely. Time was when for a comparatively minor break an entire motor shell or gear case would automatically be scrapped. Now, however, there is very little material that makes its way to the dealer in old metal. And not only so, but many castings or forgings that have been thrown away have been recovered and reinstated in useful work. When the master mechanic has nothing else to do, he studies his scrap pile to see what more he can save, and the men who do the welding will work overtime any day to show how far reaching are the possibilities in applying their skill. The junk pile is, then, not nearly so large as it was five years ago, and in future it will be still smaller. It would disappear altogether if it were not for the fact that there comes a time when it does not pay to repair further. Just when that time is each master mechanic must decide for himself, but there is a profound mathematical law which says in substance, or translated into English, "It does not pay to spend $1.05 to save $1."

Quotation from the Federal Electric Railways Commission Report

No. 8

IT would seem that so long as the railways depend upon earning power, and earning power depends upon passenger revenue, the fixed uniform fare is a broken reed for the industry or for the community to lean upon. Perhaps the general sentiment of the electric railways is best expressed by the evidence of Gen. Guy Tripp before this commission, as follows:

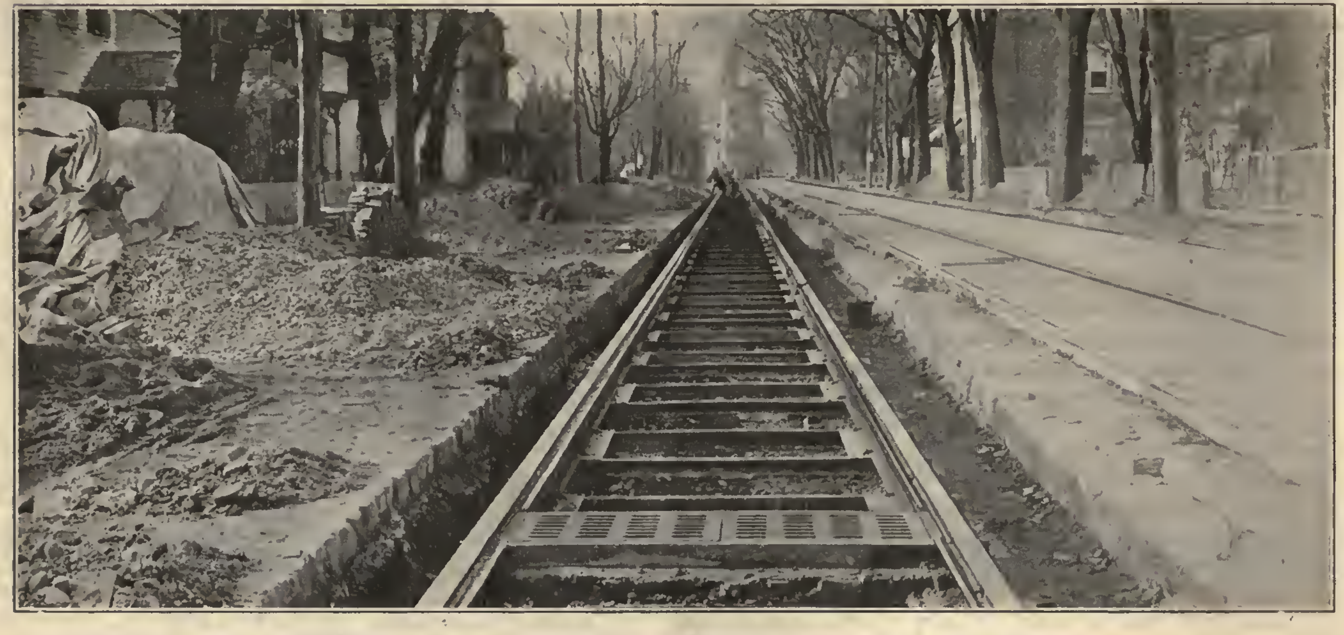
> We were all living in a fool's paradise in the street railway business when we suddenly woke up—when the war woke us up—to find that no business which cannot increase its revenues under any conditions can live or is sound.

Conversely, it may be said that no community should bind itself by contract or otherwise to continue after normal conditions have been restored a rate which might be found reasonable during this abnormal period.

Track Construction in Poughkeepsie

The Double Tracking of a Portion of the Poughkeepsie & Wappingers Falls Railway, Made Necessary by Increased Traffic and Debilitated Track Conditions, Was Carried Out by Using 103-Lb. Grooved Girder Rail with Bolted and Seam Welded Joints, Steel Ties and a Foundation and Paving of Concrete

By A. J. STRATTON
Superintendent Maintenance-of-Way Eastern Pennsylvania Railways, Pottsville, Pa.



NEW TRACK CONSTRUCTION ON MAIN STREET, POUGHKEEPSIE

INCREASES in traffic and a debilitated condition of existing track led the Poughkeepsie & Wappingers Falls Railway to reconstruct and double track its line on Main Street, Poughkeepsie, from Cherry Street to Grand Avenue, a distance of 3,600 ft. With the single-track construction a headway of eight minutes was maintained during the daytime and one of six minutes during rush hours. This interval could not be decreased, due to the location of turnouts. The track had been built in 1893, of 60-lb. A. S. C. E. rail, at the time that the road was changed from horsecar to electric operation. (See the STREET RAILWAY JOURNAL for November, 1894.) The pavement was brick on a concrete foundation.

A clause in the company's franchise made approval by the city necessary for all track construction in paved streets. The standard of the company for this type of construction was 7-in., 70-lb. plain girder rail, with continuous joints, treated wood ties and 8 in. of grouted rock ballast. The Board of Public Works, with which the power of approval rested, declined to approve the type of construction and insisted upon the use of a grooved girder rail with concrete ballast extending not less than 6 in. below the bottom of the ties.

After several conferences the specifications in brief, as decided upon, were as follows:

Rail, L.S. 103-478, International steel ties on 6-ft. centers, bolted joints, seam welded by the Lincoln process. Paving foundation and ballast to consist of 10 in. of a 1:3:6 mixture of concrete. Pavement to be of concrete, 6 in. thick, of a 1:1½:3 mixture. The shoulder between the outside rail and the adjoining brick pavement to be relaid with second-hand brick. The pavement and base to be monolithic.

The city assumed responsibility for all concrete work, the company paying for it by assessments covering a term of ten years.

SAVING WITH STEEL TIES

The company's decision to use steel ties was based upon the lower first cost of material and the saving in excavation and concrete ballast, as compared with other construction. The completed work showed a saving of $3.12 per single-track foot, divided as follows: In excavation, $0.63; in concrete ballast, $2.09; in spikes, $0.09; in cost of ties (steel vs. treated yellow pine), $0.31. In order to maintain the service on the existing track it was necessary to remove the pavement from the entire width of the track, to throw the old track to one side of the trench and then to excavate for one new track. A considerable amount of repair work on the old track was necessary, due to broken rails both at and between joints, probably caused by crystallization. In the making of these repairs it was found very economical and expedient to use an oxyacetylene outfit for cutting out broken joints. Gas was used for burning the bolt holes as well as for cutting the rail and it was possible to substitute a short piece of rail for a broken joint in ten minutes. Passing sidings had to be maintained for cars. This was accomplished by using existing special trackwork by constructing temporary stub end sidings

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[EDITORS' NOTE.—Mr. Stratton, the author of this article, was in charge of the work described.]

1, 2 AND 3—APPEARANCE OF TRACK BEFORE RECONSTRUCTION WAS STARTED. 4 AND 5—PAVING REMOVED AND TRACK SHIFTED TO THE SIDE

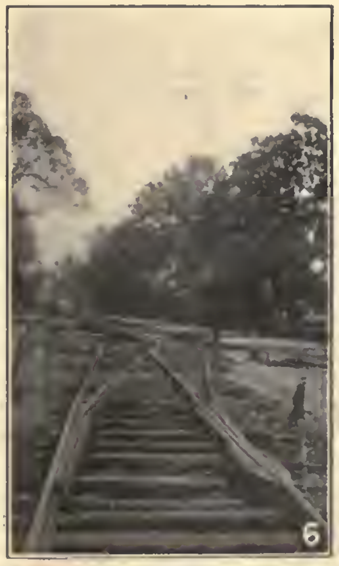
on the pavement and by using a portable crossover rented from another company.

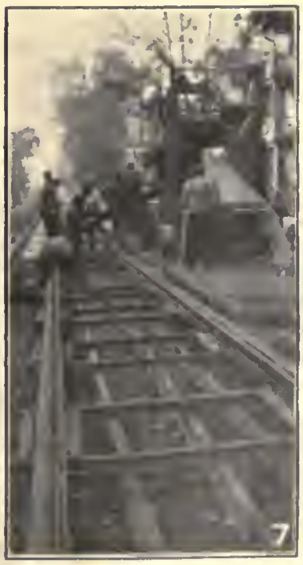
All excavating was performed by pick and shovel, the excavated material being hauled to adjoining dumps by team and dump wagon. The subgrade was rolled with a five-ton roller in accordance with the specifications of the city engineer. This was most useful in compacting the back fill over trenches dug by others to repair sewer, water and gas connections prior to construction of the new pavement. The ballast over these openings and over "soft spots" in the subgrade was reinforced by laying three parallel lengths of 60-lb. T-rail under the steel ties.

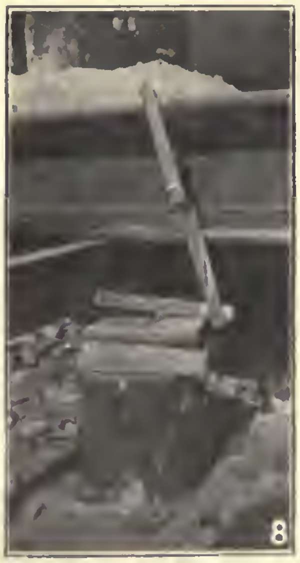
A shortage of track bolts due to non-delivery made necessary the use of but two bolts in the joint plates in portions of the new track over which cars were operated prior to concreting. This was responsible for the cold rolling of the head of the rail at the joint and made necessary the filing away of the lip so formed. Actual track laying proceeded rapidly as the accurate punching for the clips in the steel ties made gaging unnecessary. Preceding the pouring of the concrete ballast and pavement by twenty hours a section of track was blocked to surface, lined and the joint plates welded. The blocks were of white oak with the bark removed, 6 in. long and 5 in. in minimum diameter. Four of these were placed under alternate steel ties. Prior to the blocking of the track the joint plates were loosened and the rail bucked back so that a close joint might be obtained.

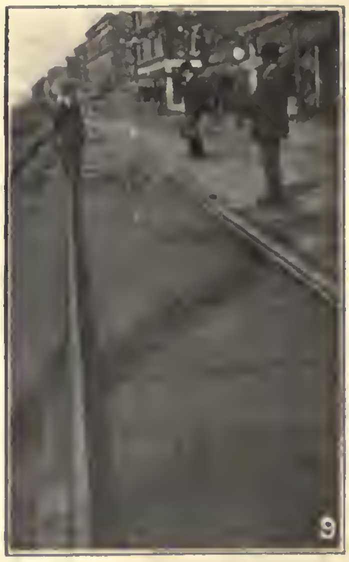
PLATES WELDED AT TOP AND BOTTOM

The joint welding was done with a Lincoln type W machine. A seam was welded at the top and bottom of the 30-in. plates. Each steel joint tie was welded to the rail and the members of the tie were welded so that a crossbond was provided at each joint. The concrete ballast and paving were placed by a contractor under the joint supervision of the city and company. The ballast and paving foundation, 10 in. in thickness, was poured for half of the total trench width, and the 6-in. surface poured for the area between the rails of the first track. The company furnished two men to assist the contractor's force in securing proper tamping of the ballast about the steel ties. The tools used were an ordinary tamping bar and an ice chisel, such as is used for the removal of ice from sidewalks. The latter tool was particularly effective in forcing the con-









6—TEMPORARY TURNOUT CONSTRUCTED ON TOP OF PAVING. 7—OLD RAILS WERE USED AS REINFORCEMENT OVER SOFT SUB-BASE. 8 AND 9—EFFECT OF EXPANSION ON TRACK AND CONCRETE BALLAST DISPLACING CONCRETE FOUNDATION

TYPE OF CONSTRUCTION USED ON MAIN STREET

crete under the bearing plates of the steel ties. The concrete was mixed with just enough water to permit the mixture to discharge freely from the mixer.

On the day preceding that on which the contractor started to pour the base several hundred feet of track were blocked to line and surface. By 3 p.m. the expansion of the rail had pushed many of the ties from their supports, the actual expansion being 3¾ in. By 8 p.m. the track had receded to its original position. It was thought that sufficient concrete could be poured before the October sun became very powerful, to hold the track in position. Such, however, was not the case. By 10 a.m. conditions obtained as shown in an accompanying illustration. Nearly 200 ft. of base had been poured, but a longitudinal movement of more than 1 in. took place through that mass. It was possible, however, immediately to retamp the ties so that no damage resulted from this somewhat unusual incident. Joints were broken several hundred feet ahead of the mixer and the track expanded 2½ in., receding again at night.

TABLE I—COSTS PER SINGLE-TRACK FOOT

1.	Engineering and superintendence	$0.250
2.	Removal of old pavement	.737
3.	Grading	1.062
4.	Ballast	4.710
5.	Ties	1.466
6.	Rails, rail fastenings and joints	2.335
7.	Catch basins	.055
8.	Insurance	.080
9.	Other expenditures	.230
10.	Joint welding, exclusive of plates and bolts	.120
11.	Maintenance of old track	.208
12.	Track and roadway labor	.798
	Total for track	12.051

This disturbance appears to have been caused by the complete insulation of the rail and ties from the earth on the wood blocks. The heat absorbed by the rail could not be dissipated in any manner other than by direct radiation. To correct this condition an occasional brick pier was substituted for the wood block, thus enabling some of the heat to be transferred to the earth. No further trouble occurred after this was done.

Tables I and II contain detailed costs covering the entire work. As special trackwork connections had not been received in time for complete installation the cost figures apply to tangent track only.

In Table I, item 1 covers supervision, inspection, timekeeping, rental of engineering instruments, advertising and other expenses properly chargeable to this account. This expense is 1½ per cent of the total cost. The high cost of grading is partly due to the fact that the greater part of the old track was lowered to the bottom of the trench for the new construction. The cost of removing the excavated material to adjacent dumps by team and dump wagon averaged 55 cents per cubic yard with teams at $8 per day.

The ballast charge is for concrete only. Due to grade changes and slight adjustments to alignment the quantity of concrete exceeded the estimate by 6.8 per cent. The contract price of the ballast was $17 per cubic yard. The cost of ties plus unloading is included in item 5. Item 6 includes cost of material, freight, unloading, etc.

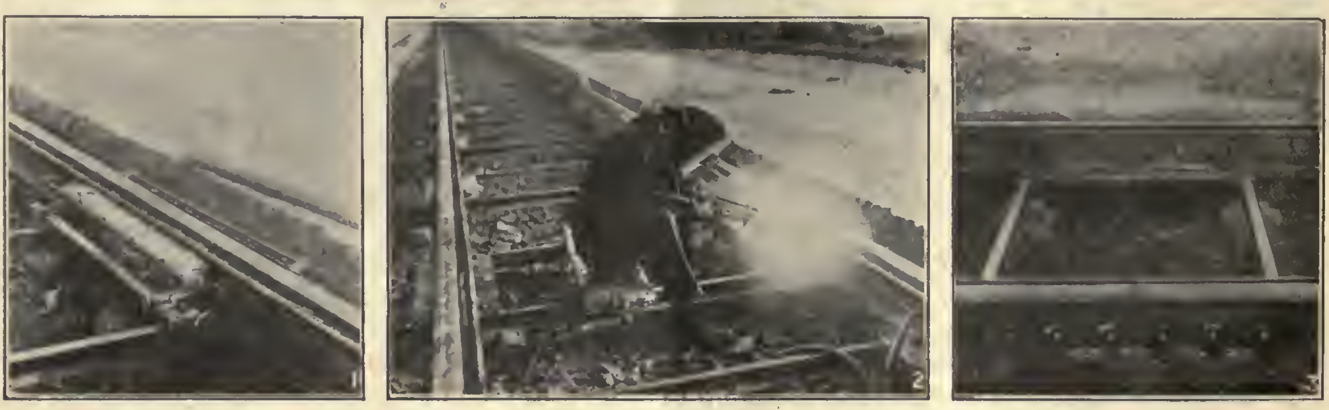
TABLE II—COST OF PAVEMENT PER SINGLE-TRACK FOOT

Six-inch concrete pavement	$3.08
Brick shoulder 1 ft. to 2 ft. wide	.55
Total for pavement	$3.63

Four catchbasins were installed with sewer connection, at a cost of $98.90 each. Item 8 refers to employer's liability insurance, and included in item 9 is the cost of shifting and rebuilding eighteen sewer manholes, plank for temporary vehicle crossings and various expenditures not properly chargeable elsewhere. The cost of joint welding shown in item 10 does not include cost of plate or bolts.

The following list shows the cost per joint. The current consumed was metered during the welding of a number of joints and the average taken:

Splice bars—No. 1—30 in.	$3.87
Track bolts—1 in. x 4½ in.	.63
Welding steel	.28
Power—7½ kw.-hr.	.18
Miscellaneous expense	.25
Labor	1.45
Royalty	.94
Total	$7.60



1—DEFLECTOR BAR IN POSITION FOR WELDING TOP EDGE OF PLATES. 2—THE WELDER AT WORK. 3—FINISHED WELDED JOINT, TOP AND BOTTOM SEAMS AND ENDS OF BOLTS WELDED, RAILS SPOT WELDED TO TIES

Item 11 includes the cost of installing temporary sidings and crossovers, as well as the maintenance of the old track in safe operating condition, and item 12 is the cost of installing the new track, handling material, providing temporary crossings for vehicles and similar charges.

The concrete pavement cost given in Table II relates to contract work only, the price being $22.75 per cubic yard. The width of the brick pavement varies from 1 to 2 ft. on each side of the railway area, due to adjustments necessary to meet the old pavement. The contract price of relaying this shoulder was $3.50 per square yard plus 50.6 cents allowed for cleaning old brick. Work began Aug. 9, and the trackwork completed Nov. 15 and the paving Nov. 20. Owing to the cold weather immediately following the completion of the pavement the contractor laid steam pipes under a covering of straw and, by using his steam roller, in a few days dried out the concrete last poured. The work was performed with a force of from twenty to fifty men. During the early days of the work labor was scarce and very inefficient. The closing down, however, of many local industries during October supplied plenty of labor, but experienced track men were not obtainable at any time. Common laborers received 50 cents per hour for a nine-hour day. In excavating for the new construction some oak and chestnut ties were unearthed which had been in the ground for more than forty-three years. These were relics of the old horsecar days and they were still in a good state of preservation.

Changes in M. C. B. Standards

Various Recommendations of Committees of the American Railway Association, Section III, Mechanical, (M.C.B.), Made at the Convention Last June, Which Were Referred to the Members by Letter Ballot, Have Recently Been Published by the Secretary of that Organization and Those of Particular Interest to Electric Railways Are Abstracted

CHANGES in "Recommended Practices and Standards" as adopted by Section III, Mechanical, of the American Railway Association, which are of interest to electric railways, and which have been formally approved, so that they now represent revised standards, are given below.

COMMITTEE ON CAR CONSTRUCTION

1. *Journal bearing lugs.* Breakage of lugs on journal bearings had been reported and strengthening of these had been suggested. This has been done and a tabulation of the new dimensions is given in the committee's report. The recent changes, it should be noted, do not interfere with interchangeability.

2. *Axle fillets.* Radii of fillets for all standard axles have been made ⅛ in. on the journal at the collar, and ¾ in. on the journal at the dust-guard seat, on the dust-guard seat at wheel seat, and on wheel seat at collar. This does not interfere with interchangeability.

3. *Axle classification.* The standard axles have been given distinguishing class letters: Axle "A" for 3¾-in. x 7-in. journal, "B" for 4¼-in. x 8-in., "C" for 5-in. x 9-in., "D" for 5½-in. x 10-in., "E" for 6-in. x 11-in., "F" for 6½-in. x 12-in.

4. *Journal box classification.* The same classification letters for journal boxes and contained parts (bearings and wedges) have been adopted as for axles, thus journal box "A" is that for a 3¾-in. x 7-in. journal; bearing "A" is 3¾-in. x 7-in., etc.

5. *Truck classification.* The following truck classification has been adopted: Two-axle trucks 2A, 2B, 2C, etc., three-axle trucks 3A, 3B, 3C, etc., the letter designating the axle used.

6. *Car classification.* A similar car classification has been adopted, namely, four-axle cars, 4A, 4B, 4C, etc.; six-axle cars, 6A, 6B, 6C, etc.

7. *Capacity of "D" axle.* The capacity of the standard axles increases by steps, and the committee felt that the steps would be made more uniform by increasing the capacity of the "D" axle (5½ in. x 10 in.) from 38,000 to 40,000 lb., the present dimensions being such that the allowable stresses shall not be exceeded. A proviso is made that no existing cars shall be marked up in capacity on account of this increase in allowable axle load until it has been determined that the body and trucks are safe under such a load.

8. *New axle "F."* A new large-size axle "F" has been adopted, with journal 6½ in. x 12 in., of nominal capacity 60,000 lb. and with bearing, wedge and journal box to suit.

9. *Figuring stresses in axles.* Referring to the 1896 report of the committee on axles, the present report states that the former did not specifically cover the locus of the points of application of load for calculating the part of axle between wheel seats. In 1901 this was referred to in connection with a report on chemical composition of all steel car axles. It is desirable to put this question in such shape that uniformity in calculations be realized. Frames above the journals of the same axle cannot spread more than 1 in., therefore the calculations for diameters of axle sections between wheel fits should be based on length between center of journal plus 1 in.

The following may be considered a continuation of the 1896 axle report, the only addition being the assumed distance between load applications:

$$\text{Allowable stress} = \frac{22{,}000}{1.26} = 17{,}460 \text{ lb.}$$

$$\text{Required diameter*} = \sqrt[3]{\frac{M}{W} \times \frac{W}{S} \times \frac{32}{\pi}}$$

Values for standard axles, based on the distance between load applications, L (distance between centers of journals) plus 1 in. are given in tabular form in the committee's report, to which the reader should refer for more complete information.

M = bending moment in inch-pounds.
W = weight in pounds.
S = stress in pounds per square inch.

Resultant theoretical diameters based on above tables and the standard method of calculation are as follows:

TABLE OF THEORETICAL AXLE DIAMETER

(Y = distance from center of axle)

Axle	Near Center Y, In.	Near Center Diameter, In.	Inside Collar Y, In.	Inside Collar Diameter, In.	At Wheel Fit Y, In.	At Wheel Fit Diameter, In.
A	1½	4.096	22½	4.707	24	4.748
B	1½	4.650	22⅛	5.348	24	5.395
C	1½	5.271	22⅛	6.050	24	6.108
D	3	5.870	22⅛	6.647	24	6.709
E	3	6.386	20½	7.154	24	7.289
F	3	6.811	20½	7.646	24	7.800

The whole matter is summed up in these definite recommendations:

First. For calculating the diameter of axles between wheel seats, assume that the loads take effect ½ in. from the center of the journal at each end of axle, making the distance between assumed points of load application 1 in. more than the distance between centers of journals.

Second. For calculating the diameters of axles outside of wheel seats, assume a lever arm from the section under consideration to the center of the journal, plus one-fourth of the standard journal diameter, and allow a unit stress of 10,500 lb. per square inch to determine the diameter for minimum road limit.

These recommendations clear up this matter, which heretofore has been indefinite.

It should be noted that the actual loads permitted to be carried are regulated by the A.R.A. code of interchange rules, from which the following is from Rule 86 of the 1920 Code:

TABLE OF AXLE CAPACITIES

Journal, New, In.	Nominal Capacity, Lb.	Total Weight on Rail, Lb.
3¾ x 7	40,000	66,000
4¼ x 8	60,000	95,000
5 x 9	80,000	132,000
5½ x 10	100,000	161,000
6 x 11	140,000	10,000

10. *Passenger-car pedestals.* The committee's attention was called to the fact that the standard passenger car pedestals have shown weakness and a large number of them break, indicating a necessity for redesign. For this reason sheets 21 and 22 of the book of standard drawings are eliminated. These show standard passenger-car pedestals for 3¾-in. x 7-in., 4¼-in. x 8-in., and 5-in. x 9-in. journals. New drawings are given which will be included in the new book of drawings.

11. *Journal-box lids.* Lids now standard are claimed to be unsatisfactory, and the present drawings of standard lids are withdrawn and a new specification substituted, which is given in full in the committee's report.

12. *Specifications for steel for car construction.* Specifications for materials used in car construction are varied from time to time. This has led on the one hand to the use of inferior materials and on the other to the rejection of materials which were really suitable.

Unit stresses commonly allowed for detail parts of cars made of steel, and which are subject to variable loads and occasional light shock, are 12,500 and 16,000 lb. per square inch. The minimum elastic limit should be double this amount, and the product of elastic limit and elongation should not be less than fifty times the allowable stress. As the test piece usually shows better physical properties than the casting or forging, the requirement for product of elastic limit and elongation should be increased by 50,000 lb., making it fifty times the allowable stress plus 50,000 lb. The reduction of area is considered of secondary importance. It should be seventy-five times the allowable stress. An addition of 50,000 lb. for variation between the test piece and the casting or forging may be made, but is considered unnecessary. The ultimate strength and content of carbon, manganese and silicon should be optional, as the other requirements control these sufficiently and the restrictions used in specifications heretofore have caused rejection of good serviceable material.

The recommendation which has been adopted is to provide specifications for all forged and cast steel used in car construction of two grades based on fundamental requirements given below:

CHARACTERISTICS OF STEEL FOR USE IN CAR CONSTRUCTION

Grade of Steel	A	B
Minimum elastic limit, pounds	26,000	32,000
Product of elastic limit and elongation	700,000	850,000
Product of elastic limit and reduction of area	975,000	1,200,000

The ultimate strength and carbon, manganese and silicon content are to be optional. Sulphur is not to exceed 0.05 per cent, and phosphorus 0.05 per cent.

The elastic limit is to be determined by extensometer and the elongation measured in a length of 2 in. Grade "A" steel shall be annealed if the carbon content exceeds 0.30 per cent or if the manganese content exceeds 0.75 per cent. Grade "B" steel shall be annealed if the carbon content exceeds 0.22 per cent or if the manganese exceeds 0.65 per cent.

Pieces of irregular section and of less carbon or manganese content, where shrinkage or other internal strains may be suspected, should also be annealed.

Unimportant details may be accepted on surface inspection only.

13. *Fundamentals of car design.* A number of matters are gone into under this heading, some of which are of great interest to the electric railway engineer. One item which merits consideration because of its being susceptible of alteration to suit electric conditions is that of strength requirements for sills and draft attachments, as follows:

In 1913 the committee adopted a basic figure for strength of draft attachments of 10 sq.in. of steel equivalent to grade "A" material for tension. This strength requirement was somewhat in excess of the strength of the coupler used at that time. A stronger coupler, type "D," has now been adopted, the strength value of which is equivalent to at least 12 sq.in. of steel of the same material.

In order to meet the increased requirements, and compare closely with the increased strength of the coupler, it is desirable to increase the strength requirements for draft-gear attachments and center sills by about 20 per cent.

The formulas on which the former requirements were based are as follows:

$$R = \text{Ratio}\ \frac{\text{unit stress}}{\text{end load}} = \frac{1}{A} + \frac{X}{SM}$$

A = Area of section in square inches

X = Eccentricity of load in inches

SM = Section modulus

For draft gear and draft attachments: (a) The minimum tension area is T; (b) the minimum shear area is 1.25 T; (c) the minimum bearing area is 0.625 T; (d) the maximum ratio $R = 1.51\ T$.

For center sills between rear followers: (e) The minimum tension area is 2.5 T; (f) the minimum shear area is 3.125 T; (g) the minimum bearing area is 1.563 T; (h) the maximum ratio is $R = 0.61\ T$.

The committee's recommendation is to increase the area *T* from 10 to 12 sq.in. of grade A steel, or an equivalent area of other grades of steel, and change the other values approximately in accord therewith: Area of center sill construction between rear followers, 30 sq.in.; minimum draft gear capacity, 150,000 lb.; ratio of unit stress to end load (maximum) for center sills, 0.05; ratio of unit stress to end load (maximum) for draft attachment, 0.125.

For draft attachments the area of steel in square inches equivalent to the minimum required strength values is:

Tension or compression (square inch. Grade "A" steel)	12
For shear, square inch	15
For bearing, square inch	7½

RECOMMENDATIONS OF COMMITTEE ON SPECIFICATIONS AND TESTS FOR MATERIALS

1. *Steel tires.* Recommended practice specifications are modified in the following particulars: Passenger car tires, formerly listed as Class 3, are now placed in Class B. Further:

	Formerly	Now
Carbon content	0.70 to 0.85	0.60 to 0.80
Manganese content	0.50 to 0.80	same
Phosphorus, not over	0.05	same
Sulphur, not over	0.05	same
Silicon	not specified	0.15 to 0.35

In the new specification the analysis is to be made from a test ingot taken during the pouring of the melt, whereas the old specification permitted the purchaser to require the manufacturer to make the analysis from turnings from a tension test specimen or from a tire, and this analysis is to conform to the requirements above stated.

The new arrangement is a little fairer to the manufacturer and imposes no hardship on the purchaser.

With regard to physical properties, the old specification laid down certain figures of tensile strength, etc., and required that the specimen be cut from a tire. The new specification provides that tension tests need not be made unless so specified by the purchaser, and when required, these tests are to be made from a test ingot taken during the pouring of the melt, and which is required to have received approximately the same amount of work as the tires which it represents. Further provision is made that if the results do not meet the requirements, a re-test may be made on a specimen cut from a tube furnished at the expense of the manufacturer.

The comparative tensile properties are for passenger tires:

	Old	New
Tensile strength, pounds per square inch	125,000	115,000
Elongation in 2 in.	8 per cent	10 per cent
Reduction of area	12 per cent	14 per cent

While the committee does not specifically state the fact, the lowering of the carbon content, and with it the tensile strength, is done to provide a tire which, because softer, will be less liable to crack.

The old specification required a drop or "falling weight" test on one tire. This has been entirely eliminated, presumably because it is felt that such a test does not represent working conditions and is inconclusive, in that a tire of steel which would withstand such a test might nevertheless fail under the repeated small blows and vibration which it undergoes in actual service. It therefore does not warrant the expense of the test.

The old specification had nothing to say about mating, or permissible variations in dimensions; the new provides that the tires shall be grouped as to outside diameters and shipped in sets, and also provides limiting dimensions very much of the same character as those for solid wrought wheels.

Under "inspection" much of the matter in the old specification relates to subjects more properly belonging in the contract and has been eliminated in the new, the latter containing only the usual inspection clauses.

2. *Journal bearings.* This matter of journal bearings is one of particular interest to the electric railways which very generally buy to the A.R.A. (M.C.B.) specification. The important changes are the following: (*a*) Before lining the brass back must be bored and tinned; (*b*) after lining, the ends shall be made smooth by scraping, filing or machining. They must not be ground or rubbed with abrasive materials; (*c*) composition of back to be as follows:

	Class A, Per Cent	Class B, Per Cent
Lead	16 to 24	24 to 30
Tin	5 to 7	4 (min.)
Total of other impurities, maximum	4	3
Copper	67 to 77	63 to 72

The purchaser should specify whether Class A or Class B is required, as otherwise the specification provides that Class A will be provided. It is evident that Class B is the softer, cheaper material.

(d) Composition of lining. Two kinds of lining composition are included, Class C for linings of a nominal thickness over ⅛ in., and Class D for linings ⅛ or less in thickness.

	Class C	Class D
Tin	3 to 5	0.5 to 1.5
Antimony	8 to 10	....
Antimony plus tin	12 to 14	3 to 5
Arsenic, maximum	0.2	....
Total of other impurities, maximum	0.5	0.5
Lead	85 to 88	94 to 96

Either composition of the back may be used with the composition of the lining metal specified for the thickness of lining which is ordered.

3. *Axles, shafts and other forgings, annealed and unannealed.* The new specification divides the material into two classes, the one "medium" and the other "mild." Medium forgings are intended for important large parts such as axles, etc. Mild forgings are to be used only where so ordered, for parts of minor importance and those which are to be case hardened.

Another new provision is that unless otherwise specified, annealed material shall be furnished for medium forgings. All axles over 6 in. in diameter at center shall be annealed. Mild forgings may be furnished unannealed unless otherwise specified.

The process of manufacturing the steel is limited to either open-hearth or electric.

It is interesting to note that this is the first reference to "electric" steel in the association's specifications, and as such is a recognition of the increasing importance of this process, already referred to editorially in a recent issue of the ELECTRIC RAILWAY JOURNAL.

While annealing is provided for as above stated, it is required that material ordered to these specifications shall under no circumstances be quenched.

The chemical composition of the two grades is as follows:

	Medium, Per Cent	Mild, Per Cent
Carbon	0.38 = 0.52	0.08 = 0.18
Manganese	0.40 = 0.70	Max. 0.55
Phosphorus	Max. 0.05	Max. 0.05
Sulphur	Max. 0.05	Max. 0.05

While it is not so stated in the specifications, it is obvious that the "mild" grade is the only one of the two which can be used for parts that are to be welded. The physical properties of the "medium" agree with the old specification. For the mild grade the following properties are required: Tensile strength, 47,000 lb. per sq.in; yield point, 0.5 tensile strength; elongation in 2 in., 30 per cent; reduction of area, 45 per cent.

A rather drastic move is the elimination of the old clause that "a sufficient discard shall be made from each ingot to secure freedom from piping and undue segregation." The committee gives no reason for omitting the clause.

4. *Carbon steel axles.* This is the standard specification for the ordinary freight-car axle purchased to chemical specification and drop test. The title is misleading inasmuch as the annealed steel axles referred to under paragraph No. 3 above are also carbon-steel axles.

The chief changes are the inclusion of the electric process in the manufacture of the steel, the raising of the top limit of manganese content from 0.60 per cent in the old to 0.70 per cent in the new, and the inclusion of the following formulas for calculating height of drop of a 2,240-lb. weight, and the permanent set produced by the first blow.

H in feet = square of diameter of axle at center in inches.

$H = d^2$

L = length of axle in inches.

Set for axles over 65 in. in length $= \frac{L}{1.9d} - \frac{d}{2} + \frac{1}{2}$ in.

Set for axles 65 in. or under in length $= \frac{L}{1.9d} - \frac{d}{2} + 1$ in.

Drop test for 3¾-in. x 7-in. journal axle is included: Diameter of axle at center, 4¼ in.; length of axle, 83¼ in.; height of drop, 18 ft.; number of blows, 5; maximum permanent set, 8¾ in.

5. *Solid wrought wheels.* The old specification for solid wrought wheels, which only covered locomotives and tenders, is now revised to include car wheels, the chemical requirements remaining unchanged.

Under "tolerances" the height of flange is required to be not more than 1/16 in. over that specified. The old specification allowed ⅛ in.

A list of gages and tapes which shall be used is given: Wheel circumference measure, A.R.A. sheet 16 B; maximum flange thickness, gage A.R.A. sheet 16; maximum flange thickness, gage A.R.A. sheet 16; rotundity gage, thickness gage A.R.A. sheet 16 A; gage for measuring service metal A.R.A. sheet C-1; plane gage, A.R.A. sheet 16 A.

COMMITTEE ON CAR WHEELS

This report refers chiefly to 33-in. chilled cast-iron wheels. Two new designs of wheels have been adopted, one 650 lb. and the other 750 lb., to take the place of the present 625 and 725-lb. wheels. These are of the same so-called archplate design, similar to the 700 and 850-lb. wheels adopted in 1917. These designs are in accordance with recommendations of the Association of Manufacturers of Chilled Car Wheels, and have been adopted on account of the universally favorable reports on the performance of the 700-lb. archplate wheel in comparison with the 650-lb. wheel of the former design. Designs of the new wheels are given in the report.

The old method of stenciling tape size is discontinued and instead a permanent record is provided as follows: Five small lugs ⅜ in. in diameter by ⅜ in. high are to be cast on inner plate near the hub, as shown on a sketch given in the report. As each wheel is taped the necessary number of lugs are to be cut off, those remaining to indicate the tape size. For example, for a normal wheel of tape-size No. 3, two lugs are to be broken or cut off, the three remaining indicating a tape-3 wheel.

A slight change is made in the maximum and minimum flange thickness gage in order to prevent wear of the gage.

The recommended practice for mounting wheels is changed in the following particulars:

1. Wheels having flanges worn so as to take limit gages for remounting cast-iron wheels shown on M.C.B. sheet 16 A shall not be remounted.

2. Wheels must have a straight bore with the exception of the chamfering for not more than ⅜ in. at the back hub face, which may be allowed to facilitate application to axles.

3. Wheels should be mounted centrally on the axle. All axles should be center punched and some form of gage be used to measure the location of the wheel from the center punch mark. The center mounting of wheels is necessary in order to secure proper running of the wheels and to prevent hot boxes.

4. Wheels should ordinarily be fitted to axles, and not axles fitted to the wheels. It is usually unnecessary to turn the wheel seat of second-hand axles unless they are a tapered fit.

5. In mounting either new or second-hand wheels, care should be used to see that the wheels are of the same diameter. In the case of new wheels, the wheels should be taped in order to check the tape size marking, and in no case should wheels of different tape sizes be applied to the same axle.

6. The alignment of axle lathe, the trueness of the centers and the jaws on boring mills should be checked frequently in order to insure proper mounting of the wheels.

7. While the wheels are being bored the high spots on the flange should be marked, and in mating the high spots should be put opposite the spots on the mate wheels.

While the provisions only represent common practice in the mounting of wheels, it is the first time they have been formulated in the A.R.A. specifications and for this reason are notable.

CONCLUSION

The action taken by the A.R.A. (M.C.B. Association) in adopting these matters is from an engineering standpoint one of the most sweeping ever taken by it. In one way or another these affect the interests of the equipment men of the electric railways, and for this reason they have been presented to the readers of this paper so that they may be in touch with the trend of affairs in the steam railway field.

Standard Hand Brake Riggings*

Some of the Most Common Types of Hand Brakes in Use on Electric Cars and the Principles Involved in Their Action Are Described and Methods Given for Calculation of Forces Acting in the Several Parts—Particular Attention Is Devoted to Devices Other than Levers for Increasing the Braking Force

BY H. M. P. MURPHY

IN COMPUTING the forces developed in any foundation brake rigging it is, of course, necessary to start with some known force. This is generally the one exerted at the brake handle where hand brakes are used, or by the brake cylinder push rod with air brakes. As hand brakes are quite generally used on electric railway cars, methods for computing the force exerted on the chain attached to the hand-brake pull-rod will be considered first.

All common types of hand-brake riggings in present use consist essentially of a wheel or handle (crank arm) mounted on a shaft or staff connected with a drum, around which a chain is wound in order to apply the brakes. In some standard constructions this drum is located directly on the hand-brake staff and is often tapered in such a way that the chain is wrapped around the small end when the brake shoes are tight against the wheels. In other cases a cam is substituted for the drum and it is so designed that it gives the same effect as the tapered drum. When hand brakes are applied to cars in connection with air brakes, the pull rod or chain controlled by the hand-brake mechanism is generally attached directly to some one of the levers of the airbrake rigging in such a way that the brakes may be set on both trucks from one or both ends of the car.

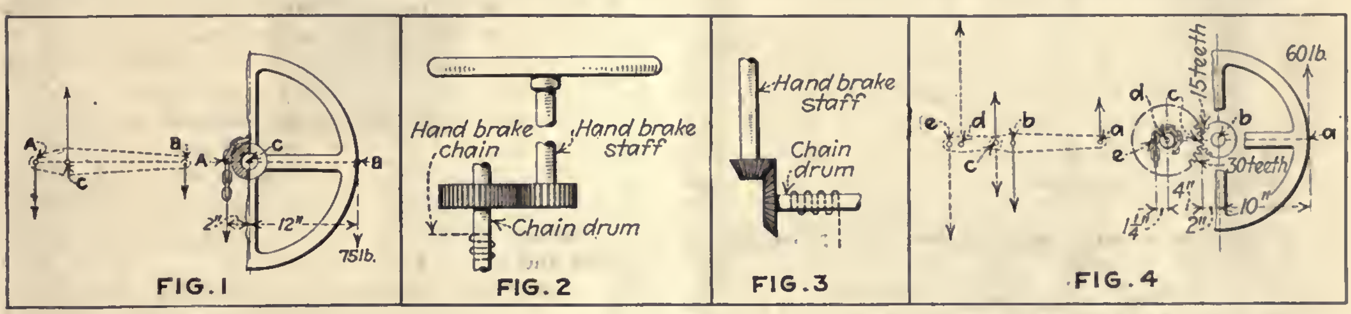


FIG. 1—GEARLESS STAFF HAND BRAKE. FIG. 2—SPUR-GEARED STAFF HAND BRAKE. FIG. 3—BEVEL-GEARED STAFF HAND BRAKE. FIG. 4—DIAGRAM OF FORCES FOR SPUR-GEARED STAFF TYPE OF HAND BRAKE

The principles involved in the determination of the forces developed by any standard hand brake are exactly the same as those outlined in a preceding article published in the ELECTRIC RAILWAY JOURNAL for Jan. 15, 1921. The problem is simply one of leverage, for chain drums, hand wheels, etc., are merely disguised forms of simple straight-line levers as will be shown in the following paragraphs:

In order to investigate the laws connected with hand brake riggings, consider the typical form of apparatus shown in Fig. 1, where a brake wheel 24 in. in diameter or 12 in. in radius is shown on a shaft carrying a small chain drum, the distance from the center of the drum to the center line of the chain being 2 in. Now it is obvious that the force developed on the chain will be constant, if a given total force be applied to the rim of of the rim to which this force be applied. In order to show clearly that the mechanism in question is actually a simple lever device, suppose that the given total force is applied at the point *B* as indicated in the figure. Evidently the line *ACB* is equivalent to a simple straight-line lever and, therefore, the relation existing between the forces acting on the rim of the wheel and on the chain may be accurately determined by the proper application of the "General Leverage Rule" given in the preceding article.

As an example illustrating the method outlined, suppose that a total force of 75 lb. is applied to the rim of the wheel in Fig. 1 and let it be required to find the the wheel, regardless of the part of the circumference resulting force developed on the chain. By applying the "Leverage Rule" and considering the brake-shaft center, C, as the fulcrum,

$$\text{Desired force} = \frac{(\text{known force}) \times (\text{lever arm of known force})}{\text{lever arm of desired force}}$$

or

$$\text{Force on chain} = \frac{(\text{force on rim of wheel}) \times (\text{lever arm of force on rim of wheel})}{\text{lever arm of force on chain}}$$

$$= \frac{75 \times 12}{2} = 450 \text{ lb.}$$

The preceding investigation shows that in order to determine the force developed on any hand-brake chain, wound on a drum which is attached directly to the hand-brake staff, it is merely necessary to know the total force applied to the rim of the wheel or handle; then to multiply this force by the radius of the wheel or crank arm, and to divide the product thus obtained by the distance from the center of the drum or shaft to the center line of the chain.

It should be noted that it is customary to assume a force of from 50 to 75 lb. as that which is applied to the rim of the wheel or to the handle of the crank, as this amount can readily be applied by a man in ordinary operation.

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*This is the second of a series of articles on brake rigging calculation. The first appeared in the Jan. 15 issue of this paper.

In all cases care must be taken to ascertain the correct distance from the center of the drum shaft to the center line of the chain. This is especially important when a tapered drum or cam is used, for in such constructions the distance in question is variable and, therefore, the brake must be fully set when measurements are made. The object in using a tapered drum or a cam is to enable the operator to take up the slack in the rigging with a comparatively slight rotation of the wheel, the chain being made of such length that when the slack is all taken up the chain will be coiled on the small part of the drum, thus permitting the desired force to be obtained on the chain.

In many cases where a powerful hand brake is required, the hand-brake chain or rod is not attached directly to one of the levers employed in the air-brake rigging but to an intermediate multiplying lever, which in turn is connected with the main rigging. The principles involved in the determination of the forces developed by such constructions are, of course, identical with those discussed in the preceding paragraphs.

USE OF GEARED HAND BRAKES

In some instances gears instead of levers are used to multiply the force applied to a hand brake wheel or crank. Figs. 2 and 3 illustrate such devices. In Fig. 3 bevel gears are employed, whereas in Fig. 2 the gears are of the plain spur type.

The principles involved in the computation of the forces developed in geared hand-brake riggings are simply those of leverage, each gear acting like a straight-line lever. In order to show this, consider the system illustrated in Fig. 4, which is a top plan view of a geared hand brake. The hand wheel has a 10-in. radius, the small gear or pinion a 2-in. radius and the large gear a 4-in. radius, while the distance from the center of the chain drum to the center line of the chain is 1¼ in., all as indicated in the figure. It will be noted that the hand wheel and small gear are both attached to the hand-brake staff, while the large gear and chain drum are fastened together so as to revolve about a common center. By an inspection of this figure it is clear that the line *a b c* practically constitutes a simple straight-line lever, the force developed at the point *c* of this lever being delivered to the point *c* of the similar lever *c d e*. Consequently to find the force developed on the hand-brake chain by a given force applied to the hand wheel it is merely necessary to employ the "General Leverage Rule" as already discussed.

To illustrate the application of the principles just outlined, suppose that a force of 60 lb. is exerted on the rim of the hand wheel shown in Fig. 4 and let it be required to find the resulting force obtained on the chain.

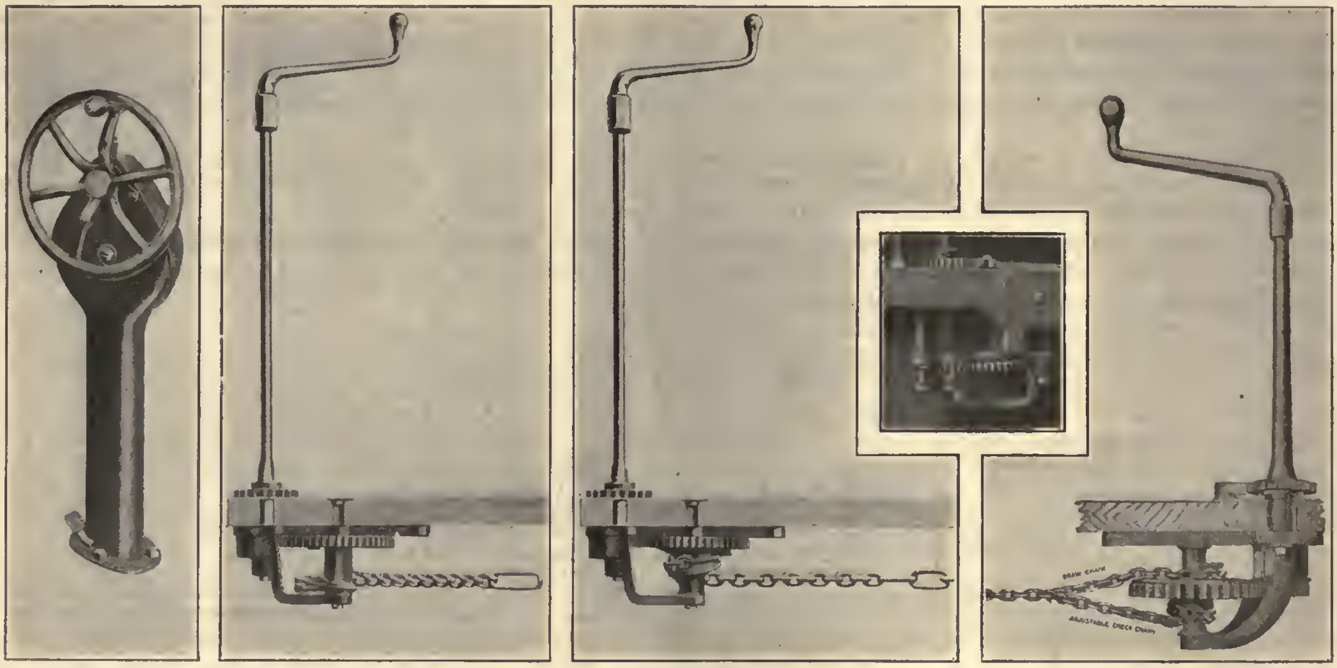


FIG. 5—SEVERAL TYPES OF HAND BRAKES USED ON ELECTRIC CARS

By considering the middle point *b* as the fulcrum of the lever *a b c*,

Force acting at point *c* =

$$\frac{\text{(force on hand wheel)} \times \text{(lever arm of force on wheel)}}{\text{lever arm of force at point } c}$$

$$= \frac{60 \times 10}{2} = 300 \text{ lb.}$$

and considering the middle point *d* of the lever *c d e* as the fulcrum,

Force delivered to chain =

$$\frac{\text{(force at } c) \times \text{(lever arm of force at } c)}{\text{lever arm of force on chain}}$$

$$= \frac{300 \times 4}{1.25} = 960 \text{ lb.}$$

If the gears used had been of the bevel type the solution of this problem would have been just the same providing, of course, that the radius of each gear had been unchanged.

As the accurate measurement of the proper radius or diameter of a gear is quite difficult, it is customary to employ the numbers of teeth instead of these dimensions, for it is a very easy matter to count the teeth in a gear and then the calculations can be made with perfect correctness. In order to use this method the following rule may be followed:

To find the force delivered to the chain of a geared hand-brake rigging multiply the total force applied to the hand wheel or crank by the product of the radius of this wheel and the number of teeth in the gear attached to the chain drum, then divide this result by the product of the number of teeth in the gear on the hand brake staff by the distance between the center line of the chain and the center of the chain drum.

This rule may be expressed more concisely in the following mathematical form:

$$\text{Force on chain} = \frac{(\text{force on wheel}) \times (\text{radius of wheel}) \times (\text{number of teeth in drum gear})}{(\text{number of teeth in staff gear}) \times (\text{distance between chain and drum centers})}$$

To illustrate the preceding rule, let it be required to find the force delivered to the chain of the rigging shown in Fig. 4 when a force of 60 lb. is applied to the rim of the hand wheel, the numbers of teeth in the gears being 15 and 30 and the leading dimensions as given in the figure.

By inserting the numerical values in the mathematical formula just given we have:

$$\text{Force on chain} = \frac{60 \times 10 \times 30}{15 \times 1.25} = 960 \text{ lb.}$$

By comparing this result with that obtained by using the gear diameters instead of the numbers of teeth it is seen that they are the same in both cases.

The most common four types of hand brakes used on electric cars are the gearless staff, spur-geared staff, spur-geared staffless and worm-geared staff. Several illustrations are given of these types, but as the principles involved are the same, calculations can be readily made in the same manner as described. In the examples given the drum on which the chain is wound has been considered as uniform throughout its length. With conical, eccentric or specially shaped drums the effective radius or lever arm for the chain is in all cases equal to the distance from the center of the drum to the center of the chain when the brakes are fully applied.

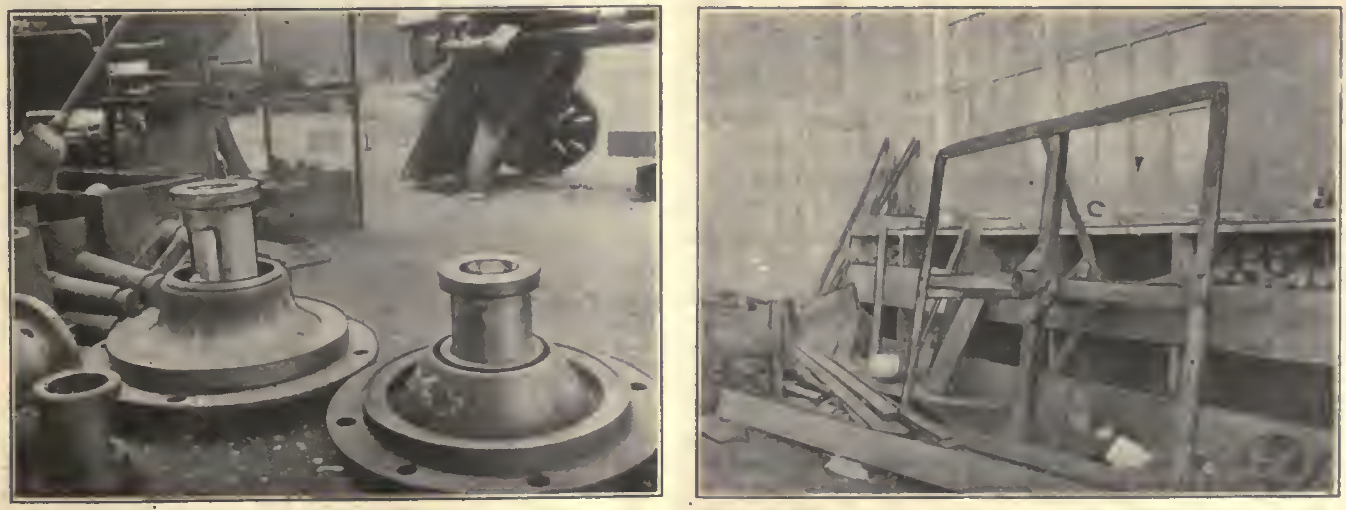
This radius will vary according to the shape of the drum, the method of winding, the shape and character of the chain and the travel of the brake shoes. Tests made by G. L. Fowler using dynamometers in the truck pull rods showed braking pressures at the wheels to vary as much as 40 per cent with the same pressure applied to the brake handle.

OPEN CAR IN PROCESS OF CONVERSION TO CLOSED TYPE AT PORTLAND

Shop Notes from Portland

Some New Devices that Have Been Found Economical in the Mechanical Department of the Portland Railway, Light & Power Company, Portland, Ore.—Electric Welding Used Extensively

AMONG the best-known electric railway shops in the United States are those of the Portland Railway, Light & Power Company, which were built in 1912 and were described in the issue of the ELECTRIC RAILWAY JOURNAL for July 26, 1913. The shops have been in use more than eight years and during this time have demonstrated their adaptability to the needs of the property. Articles covering details of practices in the shops have appeared in the columns of this paper from time to time, many of them signed by F. P. Maize, master mechanic. About six years ago Mr. Maize put into operation a planning system by which the routine and special shop work is taken care of somewhat along manufacturing lines. He covered this plan in an article in the March 18, 1916, issue, page 539, and H. C. Brumbaugh, of the mechanical department of the same company, told of the modifications which had been made in this system during the following year. This article was printed in the March 17, 1917, issue, page 488. One of the editors of the paper visited the Portland shops recently and learned from Mr. Maize that the



AT LEFT, BOX-TYPE MOTOR BEARINGS HAVE BEEN BUILT UP BY WELDING ON COPPER. AT RIGHT, A SPECIAL TRACKWORK JIG WHICH HAS GIVEN A GOOD ACCOUNT OF ITSELF war had not made necessary the abandonment of the planning system, but that abnormal labor conditions had made it necessary to combine some of the operations into groups in order to simplify the system somewhat.

At the time of the visit a job of remodeling summer cars was going through the shop, eleven cars being included in the order. A photograph of one of these cars is reproduced.

The plan in this remodeling was to produce a one-man car at a minimum of expense, to which end the side was closed in with wood, utilizing the curtain grooves in the posts as guides. Rectangular fixed sash were placed above the sidings, and above these were placed small sash which could be inclined inward for ventilation. In addition eight Garland ventilators were installed on the roof, four on each side. Simple folding steps and door were installed and the car was completed. The changes mentioned cost about $400.

FIELD COIL PRESS COMBINED WITH TESTING TRANSFORMER

Welding has been practiced in this shop for many years, one of the latest applications being in the building up of babbitted brass bearings for General Electric 210 box-type motors when these become worn so as to be loose in the motor housing. The bearings are built up with copper by the electric arc on the deposit system, old motor field wire being used for welding metal. When they are built up they are turned off a trifle large and hydraulically pressed into the housing. The fit is made so that a force of about four tons is required in the press.

THIS JIG FACILITATES SPECIAL TRACKWORK WELDING

A great deal of the special trackwork for the company is made in the shop, electric welding being extensively employed. In this connection a jig has been devised for holding pieces of special work in a vertical position to facilitate the depositing of the welding metal.

The jig was made from the frame of a discarded Brill maximum traction truck, with a center bearing attached to the frame, as shown in one of the illustrations herewith.

The frame is of flat steel ⅞ in. x 3 in. The bearing is simply a piece of 3-in. pipe with square flanges, which are spaced about 18 in. apart. The frame and bearing are connected by angle irons carried from the frame to the bearing flanges at both ends, one side of the jig being kept flat so that it will act as a faceplate, to which the special work can be bolted.

In action the jig is laid on the ground and the piece of special trackwork is bolted in place. The jig is then hoisted by means of a crane and the whole thing is supported on a rod resting on trunnions.

The special work is bolted so as to balance around the axis as nearly as possible. The operator in welding up the joints can thus rotate the work so that the joints come in such a position as to suit his convenience. Obviously the weld is most satisfactory when gravitation aids in the depositing of the metal. This simple device is reported to have been very effective in accomplishing this purpose.

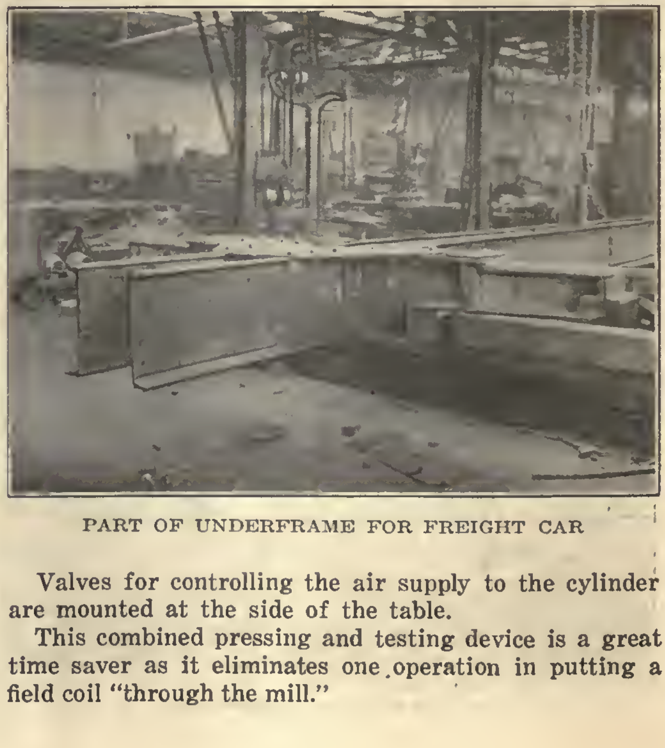
A STEEL UNDERFRAME THAT WILL WITHSTAND BUMPING

The Portland company has a great many freight cars, the construction of which is not as rugged as might be desired. It has been found in some cases desirable to put under the bodies of these cars a steel underframe like that of which one end is shown in one of the illustrations. This is built up of two 15-in. channel sections, with cast-steel bolsters riveted in place and reinforced with a ½-in. gusset plate, riveted and welded in position; ⅞-in. rivets being used. This is the company's standard underframe for freight cars, which have a carrying capacity of 80,000 lb. and a length of 41 ft. As shown in the picture, the center sill runs through and the bolster is made up in two sections.

One of the latest devices constructed in the shop is the field coil press, by means of which a hot field coil can be compressed to shape and the transformer test for insulation can be applied at the same time. Pictures of the press are reproduced herewith with a pressure plate in the "up" and "down" positions respectively.

The press consists of an 8-in. air cylinder mounted at the top of a frame of 1 in. x 4-in. steel bar. The plunger carries a rectangular pressure plate with a hole in it large enough for it to surround the core of the transformer. This pressure plate is of wood and it is attached to the plunger by four legs.

The testing transformer is mounted on a stout wooden table, and at the base of the vertical limb is a plate upon which the field coil under pressure and test rest.



PART OF UNDERFRAME FOR FREIGHT CAR

Valves for controlling the air supply to the cylinder are mounted at the side of the table.

This combined pressing and testing device is a great time saver as it eliminates one operation in putting a field coil "through the mill."

Substantial Energy Saving on P.R.T.

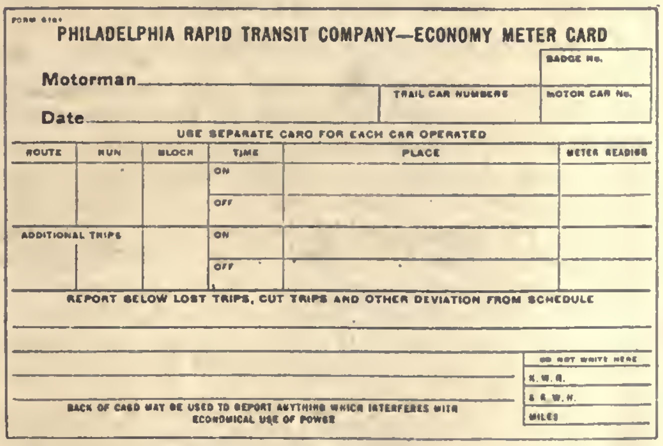
Cars Operating Out of Callowhill Depot Are Equipped with Meters Which Are Used Both for Economical Operation and for Timing Inspections—Instructors Explain to Men Methods to Be Used in Order to Reduce Amount of Power Consumed—Records Posted in Trainmen's Quarters, Resulting in Great Rivalry to Keep Records Low

CALLOWHILL DEPOT, PHILADELPHIA RAPID TRANSIT COMPANY

SINCE the middle of last summer the Philadelphia Rapid Transit Company has been operating substantially all cars out of the Callowhill Depot with the aid of Economy watt-hour meters, which are used both in inducing energy saving and in controlling maintenance inspection. Nine complete routes and one partial route are operated from this depot, the total number of cars equipped with meters being 300. A total of 310 meters suffices for this work. The type of meter employed is one equipped with the usual kilowatt-hour dial for reading the car-energy consumption and in addition with three inspection dials, known respectively as A, B and C dials, for indicating when the car equipment is due for inspection.

Installation of the meters was begun at the Callowhill Depot on May 5, 1920, and was completed on Aug. 12. The meters were installed at an average rate of three per day, and as soon as each route was completely equipped the trainmen were asked to turn in a record of meter readings at the beginning and end of each relief, one record card being required for each car on which each man operated. The cards used are of the form shown in Fig. 1, a standard size of 4 in. x 6 in. having been selected for convenience in filing. It will be noted that this card calls for the name of the motorman, the date and the number of the motorman's badge, the motor car, the trail cars, the route, the run and the block. The times and places when and where the motorman takes the car are called for, as well as the meter reading corresponding.

While the meters were being installed, and before the motormen were asked to turn in cards, the readings of all meters already installed were reported each day, together with the corresponding mileage, so as to fur-



FORM [illegible]

PHILADELPHIA RAPID TRANSIT COMPANY—ECONOMY METER CARD

BADGE No.

Motorman

TRAIL CAR NUMBERS

MOTOR CAR No.

Date

USE SEPARATE CARD FOR EACH CAR OPERATED

ROUTE	RUN	BLOCK	TIME	PLACE	METER READING
			ON		
			OFF		
ADDITIONAL TRIPS			ON		
			OFF		

REPORT BELOW LOST TRIPS, CUT TRIPS AND OTHER DEVIATION FROM SCHEDULE

DO NOT WRITE HERE

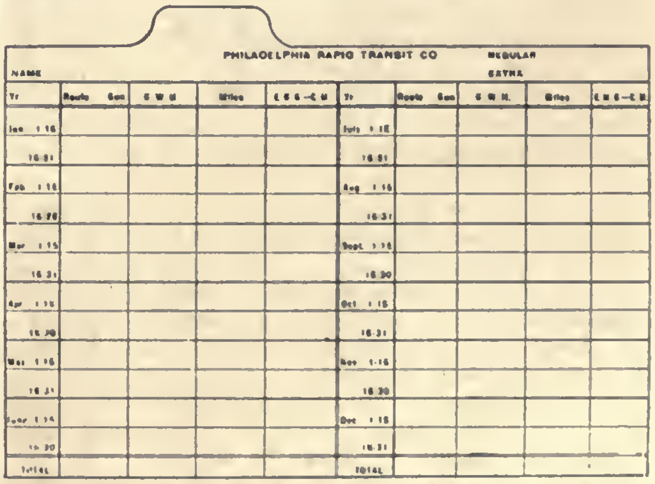
K. W. H.

K. W. H.

MILES

BACK OF CARD MAY BE USED TO REPORT ANYTHING WHICH INTERFERES WITH ECONOMICAL USE OF POWER

FIG. 1—CARD USED FOR RECORDING ORIGINAL METER DATA FILED BY MOTORMAN



PHILADELPHIA RAPID TRANSIT CO

NAME

REGULAR

EXTRA

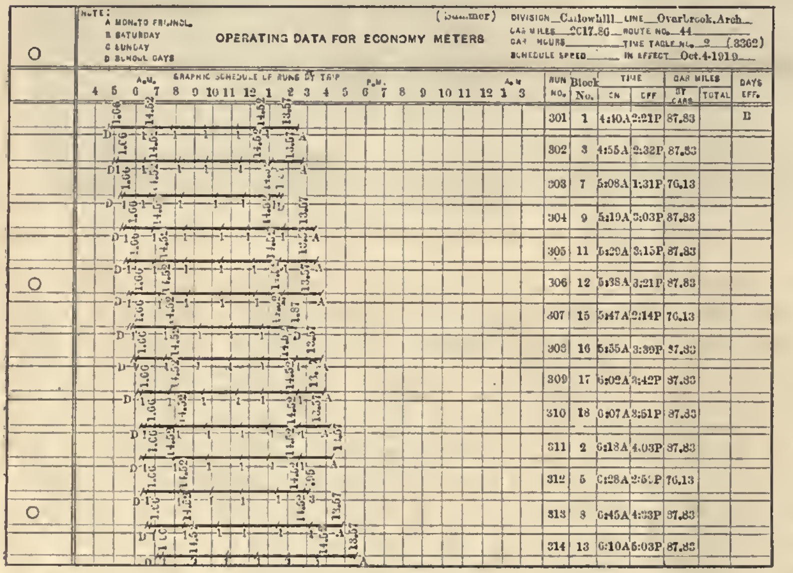
Yr	Route Sec	K W H	Miles	K W H—C M	Yr	Route Sec	K W H	Miles	K W H—C M
Jan 1 15					July 1 15				
16 31					16 31				
Feb 1 15					Aug 1 15				
16 28					16 31				
Mar 1 15					Sept 1 15				
16 31					16 30				
Apr 1 15					Oct 1 15				
16 30					16 31				
May 1 15					Nov 1-15				
16 31					16 30				
June 1 15					Dec 1 15				
16 30					16 31				
Total					Total				

FIG. 2—GUIDE USED IN FILING METER CARDS AND IN SUMMARIZING DATA

nish the basis for later determining the saving. Daily records were not available for some of the routes, so that the so-called reference period was estimated by using the total power consumption on each car from the time the meter was installed until the motorman turned in the first record. These records of the performance prior to the time that the motormen began turning in cards were carefully gone over and any items which appeared unreasonable and could not be substantiated were omitted from the result. The meters' dials were in full view of the motormen during this period.

INSTRUCTION AND FOLLOW-UP

Previous to the inauguration of the system on each route an instructor saw each motorman on the route and explained the method of filling out the card, having the motorman fill out a sample. On the morning of the day when the motormen were to begin turning in their records one of the inspectors was on duty at the carhouse to see that each man was provided with a card or cards and that he remembered his instructions in filling them out.



NOTE:
A MON. TO FRI. INCL.
B SATURDAY
C SUNDAY
D SCHOOL DAYS

(Summer)

OPERATING DATA FOR ECONOMY METERS

DIVISION Callowhill LINE Overbrook.Arch
CAR MILES 2C17.86 ROUTE NO. 44
CAR HOURS ______ TIME TABLE NO. 2 (8362)
SCHEDULE SPEED ______ IN EFFECT Oct. 4-1919

RUN NO.	Block No.	TIME ON	TIME OFF	CAR MILES BY CARS	CAR MILES TOTAL	DAYS EFF.
301	1	4:40A	2:21P	87.83		B
302	3	4:55A	2:32P	87.83		
303	7	5:08A	1:31P	76.13		
304	9	5:19A	3:03P	87.83		
305	11	5:29A	3:15P	87.83		
306	12	5:38A	3:21P	87.83		
307	15	5:47A	2:14P	76.13		
308	16	5:55A	3:39P	87.83		
309	17	6:02A	3:42P	87.83		
310	18	6:07A	3:51P	87.83		
311	2	6:18A	4:03P	87.83		
312	5	6:28A	[illegible]	76.13		
313	8	6:45A	4:33P	87.83		
314	13	6:10A	5:03P	87.83		

FIG. 3—GRAPHIC SCHEDULE FOR USE IN CHECKING DATA ON METER CARDS

A statement was made up showing the energy consumption per car-mile by each individual motorman, and this was posted in the trainmen's quarters each day for the first three days after the inauguration of the system on each route. Since the first three days the records have been compiled by half-month periods. These statements are posted in the trainmen's quarters within two or three days following the end of each period.

The instructors were given copies of the daily reports for each newly inaugurated route and of the semi-monthly reports for all routes. They rode with the men whose records showed high power consumption and explained the method to be used in order to reduce the amount of power consumed. They also rode with the men whose records showed particularly low power consumption and gave them encouragement to continue their careful operating and to describe their methods to the other men.

The record as posted each half month showed the men classified by type of run and by line, giving the name of the man with the best, or lowest, energy consumption in each class at the head of the list, and showing the others in the order of kilowatt-hour consumption per car-mile.

The men showed considerable enthusiasm and rivalry in trying to keep their records low and accomplished substantial savings almost immediately after they began turning in records.

After the instructors had been engaged in this work for two months they were assigned to give instructions at other depots in order to reduce power consumption on lines running out of those depots in which the cars were not equipped with meters.

At the end of the run the motorman turns in his meter card to the receiver. It is turned over to a clerk, who notes on the meter card the number of kilowatt-hours which have been used and the mileage operated.

The cards are then filed by badge number of motorman, each line being filed in a separate drawer. The cards are filed behind a guide record card like that shown in Fig. 2. This routine work for the 300 cars requires the full time of one girl, but actually two are employed for about half time upon it in order to provide an understudy for the work.

An important part of this routine task is the checking of the motorman's entries and finding and entering on each card the mileage corresponding to the run. A graphic schedule like that shown in Fig. 3 is employed for this purpose. A second chart, like that shown in Fig. 4, is used for quickly making adjustments in mileage in case of extra trips or turnbacks.

At the end of each semi-monthly period the filing drawer for each route is removed from the file and the entries on the cards are totalized for kilowatt-hours and miles for the period by means of an adding machine. The adding machine slips are turned over to a clerk, who computes the kilowatt-hours per car-mile for each man and on each route for each of the three groups of men; that is, for those having early runs, swing runs and late runs respectively.

In the semi-monthly summarizing work four clerks and a stenographer are employed for one and one-half days.

The results are tabulated in uniform style and posted in the trainmen's quarters in from two to three days following the end of the period covered.

PUTTING THE RESULTS IN ATTRACTIVE FORM

For use of the company officials the data are also graphed for each route in the general form represented in Fig. 5, which shows the saving expressed in terms of an average pre-meter-period consumption. The does not allow for seasonal variation in energy consumption per car-mile, which is cared for in the chart reproduced in Fig. 6.

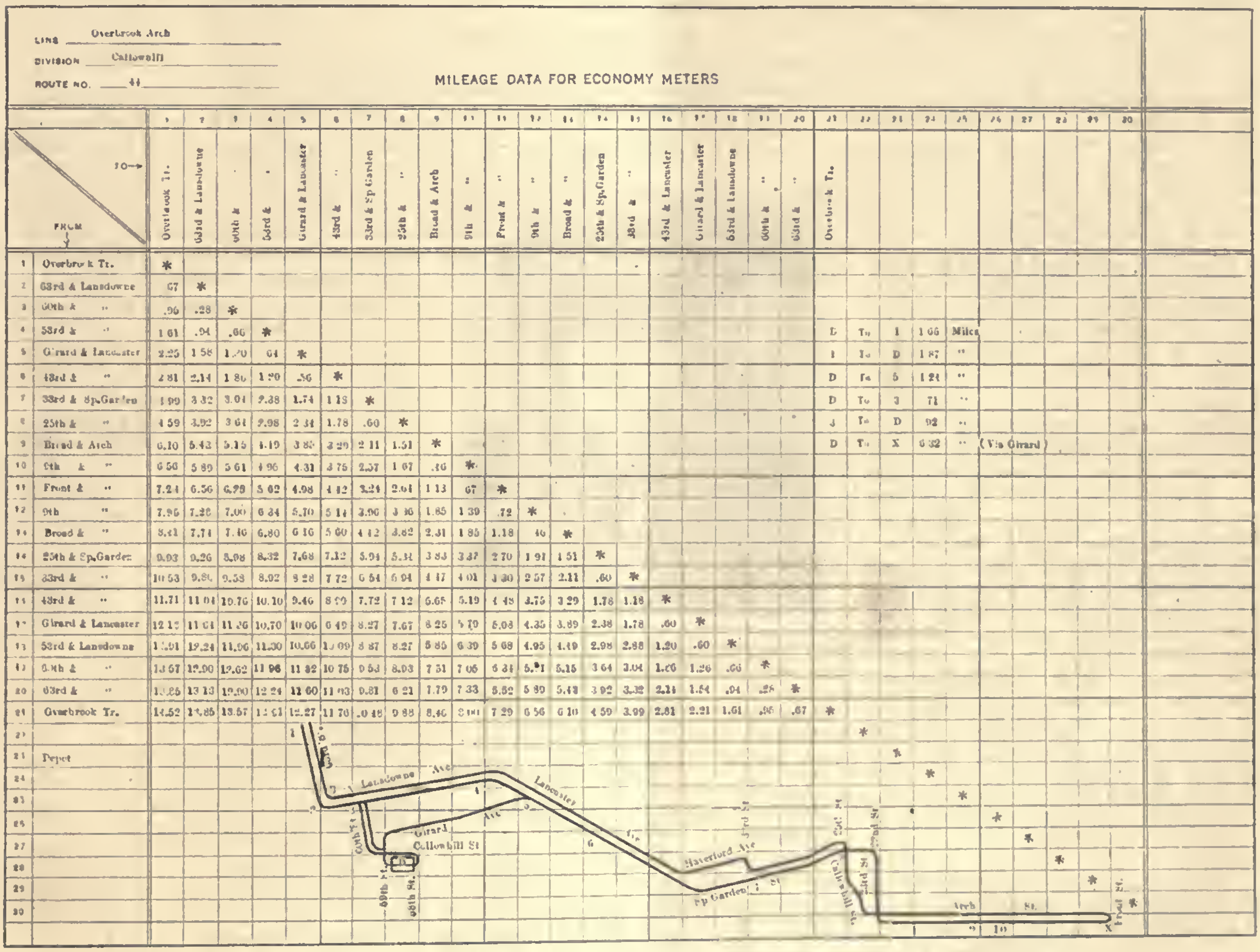
The effect of the use of meters on an individual motorman is graphically shown in Fig. 7, in which a progressive improvement is noted. The motorman whose record is here given started in with an energy consumption higher than the average for the line and at the end of the period recorded had a much lower record than the average, having reduced his energy consumption practically 30 per cent in less than three months.

An important use of the Economy meters is that of making mechanical and electrical car inspections on the basis of kilowatt-hours rather than on the mileage and time basis. These meters have a separate set of three dials for this purpose.

The A, B and C dials are each equipped with a stationary marker hand, or "telltale," enameled red, which can be set at any predetermined point corresponding to that number of kilowatt-hours of energy consumption which may be selected as the limit of inspection of any particular part of the equipment. This setting is simply the kilowatt-hours equivalent of the car mileage inspection interval. The dials also are equipped with meter-driven hands which make one revolution for 5,000, 15,000 and 30,000 kw.-hr. for the A, B and C dials respectively.

In practice the inspection interval markers are so set that the kilowatt-hour intervals on the B dial are multiples of those on the A dial, and those on the C dial are multiples of those on the B dial. Thus the cars are brought in for inspection in accordance with the coincidence of the moving and stationary hands. This brings about the occurrence of ends of two or three inspection intervals at the same time, with the result that cars are not housed so frequently as they otherwise would be. After an inspection has been made the meter-driven hands which announced the inspection are turned back to a stop pin at zero. To do this a key must be inserted in a lock which releases the reset plungers, one for each dial, at the bottom of the meter case; withdrawal of the key interlocks the reset plungers and prevents unauthorized movement of the inspection dial hands. This dial and the reset function independently of the cyclometer type dial, which registers the car-energy consumption.

The mechanical department of the railway has worked out an inspection and maintenance schedule utilizing the dials which is covered in a series of instructions issued to inspectors. These are reproduced on pages 358 and 359. When the inspector checks up the conductors' registers at night he also checks on a form like that shown in Fig. 8 the numbers of cars due for A, B or C inspection. This information is turned over to the carhouse foreman, who orders the cars in as they can be spared. The rolling-stock department records daily inspections by the meter dials on the form shown in Fig. 9.


LINE Overbrook Arch
DIVISION Callowhill
ROUTE NO. 44

MILEAGE DATA FOR ECONOMY METERS

	FROM \ TO→	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
		Overbrook Tr.	63rd & Lansdowne	60th & "	53rd & "	Girard & Lancaster	43rd & "	33rd & Sp.Garden	25th & "	Broad & Arch	9th & "	Front & "	9th & "	Broad & "	25th & Sp.Garden	33rd & "	43rd & Lancaster	Girard & Lancaster	63rd & Lansdowne	60th & "	63rd & "	Overbrook Tr.									
1	Overbrook Tr.	*																													
2	63rd & Lansdowne	67	*																												
3	60th & "	.96	.28	*																											
4	53rd & "	1 61	.94	.66	*																	D	To	1	1 66	Miles					
5	Girard & Lancaster	2.25	1 58	1.30	64	*																I	To	D	1 87	"					
6	43rd & "	2 81	2.14	1 86	1 20	.56	*															D	To	5	1 21	"					
7	33rd & Sp.Garden	3 99	3 32	3.04	2.38	1.74	1 18	*														D	To	3	71	"					
8	25th & "	4 59	3.92	3 64	2.98	2 34	1.78	.60	*													J	To	D	92	"					
9	Broad & Arch	6.10	5.43	5.15	4.19	3 85	3 29	2 11	1.51	*												D	To	X	6 32	"	(Via Girard)				
10	9th & "	6 56	5 89	5 61	4 96	4.31	3 75	2.57	1 67	.46	*																				
11	Front & "	7.24	6.56	6.28	5 62	4.98	4 42	3.24	2.04	1 13	67	*																			
12	9th "	7.96	7.28	7.00	6 34	5.70	5 14	3.96	3 36	1.85	1 39	.72	*																		
13	Broad & "	8.41	7.74	7.46	6.80	6 16	5 60	4 42	3.82	2.31	1 85	1.18	46	*																	
14	25th & Sp.Garden	9.93	9.26	8.98	8.32	7.68	7.12	5.94	5.34	3 83	3 37	2 70	1 91	1 51	*																
15	33rd & "	10 53	9.86	9.58	8.92	8 28	7 72	6 54	5 94	4 17	4 01	3 30	2 57	2.11	.60	*															
16	43rd & "	11.71	11 04	10.76	10.10	9.46	8 90	7.72	7 12	6.65	5.19	4 48	3.75	3 29	1.78	1.18	*														
17	Girard & Lancaster	12 15	11 61	11 26	10.70	10 06	9 49	8.27	7.67	6 25	5 79	5.08	4.35	3.89	2.38	1.78	.60	*													
18	53rd & Lansdowne	13.01	12.24	11.96	11.30	10.66	10 09	8 87	8.27	6 85	6 39	5 68	4.95	4.49	2.98	2.88	1.20	.60	*												
19	60th & "	13 57	12.90	12.62	11 96	11 32	10 76	9 53	8.93	7 51	7 05	6 34	5.61	5.15	3 64	3.04	1.26	1.26	.66	*											
20	63rd & "	13.85	13 13	12.90	12 24	11 60	11 03	9.81	9 21	7.79	7 33	6.62	5 89	5.43	3 92	3.32	2.14	1.54	.94	.28	*										
21	Overbrook Tr.	14.52	13.85	13.57	12 91	12.27	11 70	10 48	9 88	8.46	8 00	7 29	6 56	6 10	4 59	3.99	2.81	2.21	1.61	.95	.67	*									
22																							*								
23	Depot																							*							
24																									*						
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26																											*				
27																												*			
28																													*		
29																														*	
30																															*

FIG. 4—CHART USED FOR COMPUTING MILEAGE FOR ENTRY ON METER CARDS

In the Callowhill Depot there are the following different types of cars: (1) Near-side cars, equipped with modern motors; (2) the Hog Island cars, equipped with modern motors and type H L control; (3) the pay-within cars, equipped with an old type of motor and type K control. Both the near-side and the Hog Island type cars are equipped with slack adjusters, while the pay-within type is not.

At the present time the setting for the A dial in-

(See continuation on page 360)

Instructions for Inspection of Equipment*

Inspection by the A Dial

(ITEMS 1 TO 10)

1. *Trolleys.*

Examine trolley wheels to see that contact springs are in good condition, and that there are enough washers between wheel and contact springs, that the wheel is not flat, and that its diameter is not below the condemning gage. Be sure that trolley catchers and rope are in good condition.

2. *Controllers.*

Replace all controller fingers and segments which are worn to the scrapping point. Blow dust from the controller, after which wipe all grease and dirt from fingers and cylinder, and make a very light application of lubricant. Operate the P C type controllers by power from the master controller (after the main switch has been opened) to determine whether all points are made correctly. Examine contactor tips for wear and put a trace of lubricant on the cams.

3. *Circuit Breaker and Line Breaker.*

Examine circuit breakers and line breakers to determine wear and adjustment of contacts. Note should also be taken of the location of the power-breaking adjustment.

4. *Brakes.*

Replace any shoes that are worn to the condemning point and see that all shoes are properly equipped with keys and that heads are tight. Be sure that slack adjusters, if any are installed, are functioning properly, and that adjusters which are working incorrectly are reset or replaced. On cars not equipped with adjusters make the necessary adjustments with turnbuckles, and make sure that jamb nuts are properly tightened so as to prevent brakes from becoming prematurely slack. See that all brake pins are in good condition, provided with cotter keys and well lubricated, and that the air governor cuts in at 65 lb. and out at 75 lb. Apply a small quantity of grease to side bearings of the slide type.

5. *Fenders.*

Trip fenders from the platform and with the tripping gate, and reset from the platform to determine whether in good working order. Replace broken slats and apply lubrication if needed. Examine screens under the platform on cars of the near-side and Public Service type to see that they are in good condition.

6. *Sanders.*

Examine sand pipes as to alignment with the rail and apply sand to insure that it is flowing freely.

7. *Motors.*

Examine motor brushes for chipping and wear, brush springs for weakness and breakage and commutator for flashover. Any evidence of flashover should be reported to the chief inspector. Apply a wrench to all gear-case and motor bolts to insure their tightness.

8. *Journal Boxes.*

Examine journal boxes for loose lids and have necessary repairs made.

9. *Trap Doors.*

Remove any dirt that has accumulated around trap doors.

10. *Air Compressors.*

Examine air compressors for brush-spring tension and brush wear.

Inspection by the B Dial

(ITEMS 11 TO 24)

Items 11 to 16 like Items 1 to 6 above except for additions as indicated.

13. *Circuit Breaker and Line Breaker.* (Same as Item 3 with the addition below.)

Gage line breaker contactor finger to determine if contact pressure is sufficient.

FRONT PLATFORM OF CAR SHOWING POSITION OF METER

16. *Sanders.* (Same as Item 6 with the addition below.)

Examine valves and piping for leaks.

17. *Wheels.*

Gage wheels for thin flanges and report thin flanges to the shop foreman.

18. *Journal Boxes.* (Same as Item 8.)

19. *Motors.* (Same as Item 7 with the addition below.)

Fill armature and axle bearing with oil to the point indicated by the gage or with the measure provided for the purpose. Examine motor leads closely for poor insulation and properly tape any that are found in bad condition. Wipe carbon dust off brushholders, insulators and yokes carefully.

20. *Trap Doors.* (Same as Item 9.)

21. *Doors.*

Examine doors and steps for adjustment. See that steps are completely up when doors are closed and entirely down when doors are open. Properly lubricate all moving points such as tracks, levels, slides, guides and crankpins. On doors which are operated by an overhead engine carefully wipe out all waste, oil and grease which have accumulated in the engine box. Examine doors which are operated by air engines for speed, and if they are too slow or too fast adjust them.

22. *Engineer's Valves.*

Try engineer's valves and lubricate them if they are not working freely.

23. *Air Compressors.*

Examine air compressors for brush spring tension and brush wear. Oil them if necessary.

24. *Air Governors.*

Examine air governors as to condition of tips and leads, and for air leaks.

Inspection by the C Dial

(ITEMS 25 TO 49)

25. *Trolleys.* (Same as Item 1 with addition below.)

Examine trolley bases for adjustment, *i.e.*, that ball bearings are not becoming too loose, and apply a small quantity of oil to the bearings. Tighten trolley base terminals if loose. Take trolley pole tension with the spring balance or weights provided for the purpose. Examine links and pins for wear. Paint pole and base if necessary.

26. *Controllers.* (Same as Item 2 with addition below.)

Examine cable connections carefully. Replace cylinders which are partly short-circuited across insulators.

27. *Circuit Breakers and Line Breakers.* (Same as Item 13 with addition below.)

Blow out breakers with bellows or dry air from the reservoir, after which apply a very small quantity of oil to the contactor hinge pin. Examine covers of line breakers carefully and make necessary repairs and painting if necessary.

28. *Fenders.* (Same as Item 5.)

29. *Sanders.* (Same as Item 16.)

30. *Brakes.* (Same as Item 4 with addition below.)

Put all release springs in good condition, and replace bent beams, worn heads and worn hangers and hanger brackets subject to the decision of the chief inspector. Apply hand brakes from both ends of the car and make all necessary repairs and adjustments. Examine brake pistons for leaks and give them a quarter turn to distribute wear. Repack slack adjusters with grease provided for that purpose and thoroughly clean threads. Replace slack adjuster rocker arms and fingers that are worn excessively. Thoroughly lubricate the radial bar rollers and all rub plates and replace them if necessary.

31. *Wheels.*

Gage wheels for thin flanges, and also for limit wear of treads, and call the attention of the shop foreman to conditions found.

32. *Journals.*

Examine journal boxes for loose lids and make necessary repairs. Examine them also to see that they have a sufficient quantity of waste well saturated with oil.

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*The inspection and repair must be such that, in the opinion of the foreman, the car will stay in service until the next inspection.

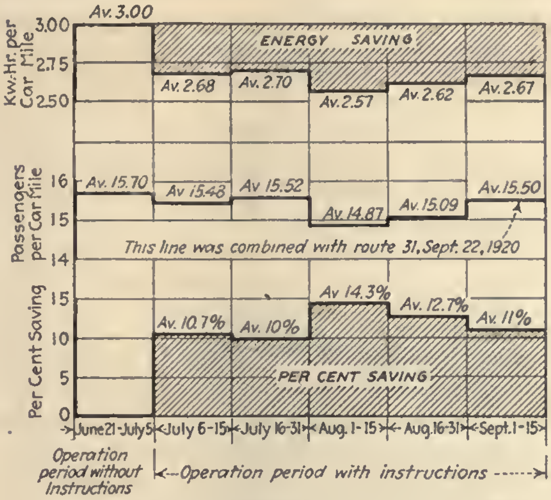


FIG. 5—GRAPHIC PRESENTATION OF POWER OPERATING DATA TO SHOW RESULTS OF USE OF METERS

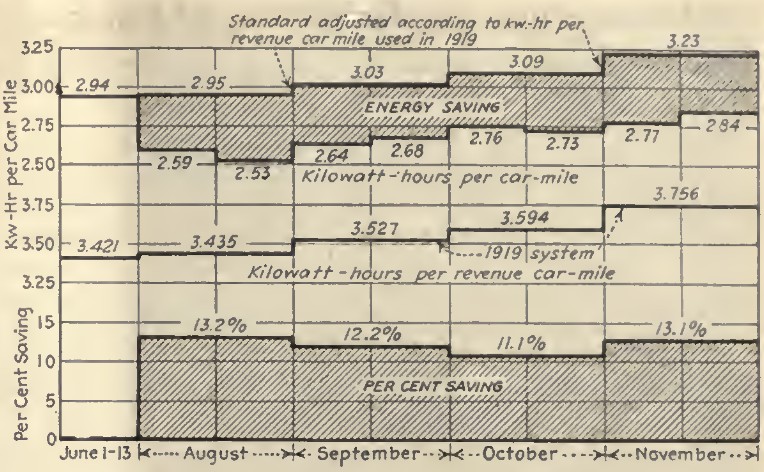


FIG. 6. GRAPHIC RECORD WITH ALLOWANCE FOR SEASONAL VARIATIONS IN ENERGY CONSUMPTION PER CAR-MILE

33. *Trucks.*

Tighten all truck bolts if loose and replace lost bolts. Examine truck frames for bends and breaks and elliptic springs for breaks and cracks. Examine coil springs also. Raise the car body sufficiently to permit the application of a small quantity of grease to center bearings and to side bearings of the slide type.

34. *Drawbars and Couplers.*

Inspect drawbars, drawheads, Tomlinson couplers, and all parts pertaining thereto to see that they are in good working order.

35. *Motors.* (Same as Item 19 with addition below.)

Remove waste from motor oil boxes and replace with new any waste that is in bad condition. Use the waste removed from armature boxes in axle boxes if not damaged from overheating. Examine all oil-box lids as to hinges and springs and axle bearings for wear. Lubricate gears and pinion with the grease provided for this purpose, and in the quantities prescribed by the chief inspector. Examine pinions to ascertain if any are loose or worn to the condemning point. Tighten axle collars if loose, and adjust them if necessary. Examine also suspension bars, springs and bolts. Take armature clearance with the gage provided therefor. Blow out all motors with dry air, after which wipe holders, yokes, commutators and string bands carefully with cloth. Do not use "two-ways" or splice motor leads. Renew leads which are in bad condition.

36. *Trap Doors.*

Remove any dirt that has accumulated around trap doors and make all necessary repairs.

37. *Doors.* (Same as Item 21 with addition below.)

Replace badly worn parts, examine door engines for leaks and repack with grease if necessary.

38. *Engineer's Valves.*

If engineer's valves are not in prime condition take them apart and clean and pack them with grease provided for this purpose.

39. *Air Compressors.*

Examine air compressors for brush spring tension and brush wear. Oil them if necessary. Test compressors for time required in pumping from zero to 75 lb. to determine condition of valves and piston rings. Blow-dust from motor, after which wipe brush-holders and commutator with cloth.

40. *Air Governors.*

Include in the air governor inspection test to determine the pressure at which the governor cuts in and out and make all necessary repairs and adjustments.

41. *Emergency Valves.*

Examine emergency valves, such as used on S. K. and S. P. C. cars, to determine if they function properly by applying engineer's valve to emergency position and noting the quick action of the brake and the time required for full release. If valves are sluggish take them apart and thoroughly clean and properly lubricate them.

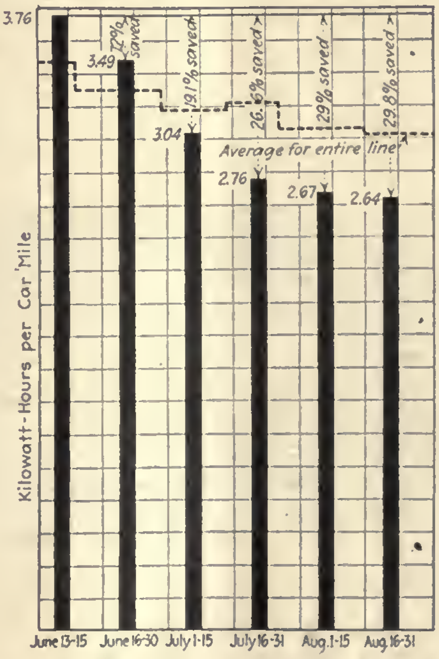


FIG. 7—GRAPH SHOWING EFFECT OF CARE ON PART OF MOTORMAN IN REDUCING ENERGY CONSUMPTION

42. *Gongs.*

Examine gong plungers and clappers for wear and replace if needed and tighten floor plates if loose.

43. *Fuse Boxes.*

Lubricate fuse binding screws if necessary. Examine leads for bad insulation and corrosion at terminals. Paint box if necessary.

44. *Rheostats.*

Examine rheostats for loose or warped grids, loose terminals and hanger bolts, bad leads and connections and make replacements where necessary.

45. *Glass.*

Include in glass inspection all glass in car, such as headlight lenses, red and green light lenses, vestibule windows, door glass, side windows, deck glass and air gage glass. Replace any glass that is cracked or broken and make necessary repairs to all that is loose.

46. *Seats.*

In inspection of seats include a thorough examination of cross-over seat mechanism as well as cushions and backs of all seats. Make replacements and repairs where needed.

47. *Car Body Fixtures.*

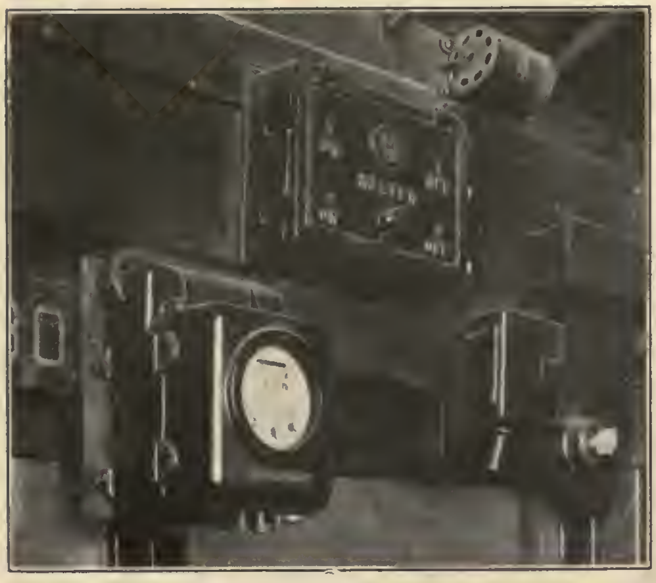
Include in the inspection of car body fixtures the register backs, signal bells, pulleys, push buttons and buzzers, grab handles and hand straps, window screens, signs and heaters. Make all necessary repairs, replace broken parts and tighten loose parts. Examine emergency jacks and lubricate and repair them if necessary.

48. *Switches.*

Include in this item the inspection of all switches, such as air, light, heat, drum, power and all other auxiliary circuit switches, to see that they are in proper working order.

49. *Bus-Line Couplers.*

On cars which are operated in trains or which pull trailers, examine the bus-line couplers to see that the insulation is in good condition. Examine carefully also the supporting springs and attachments and make necessary repairs.



KILOWATT-HOUR METER IN POSITION SHOWING A, B AND C DIALS USED FOR DETERMINING LENGTH OF INSPECTION PERIOD

spection on the near-side cars is 1,500 kw.-hr., for the B dial 6,000 kw.-hr. and for the C dial 12,000 kw.-hr. The setting on the Hog Island cars is, A dial 1,690 kw.-hr., B dial 6,750 kw.-hr. and C dial 13,500 kw.-hr. The setting on the pay-within cars is, A dial 875 kw.-hr., B dial 4,375 kw.-hr. and C dial 13,125 kw.-hr.

Thus it is seen that the interval between A inspections on the cars with the slack adjusters is greater than it is on the pay-within cars, which are not equipped with slack adjusters.

PROCEDURE IN CARHOUSE ROUTINE

Roughly, the plan is to divide the work at the carhouse into units of approximately 100 cars each. In other words, there are three inspection gangs, each of which is in charge of one "inspection leader." Each gang consists of approximately seven workmen, who as nearly as possible are all-round men. The leader is in reality a working foreman and, of course, is responsible for the work of his gang. He is the only one authorized to reset the inspection hands after the work of inspection is completed.

The general plan is to put all the cars due for A inspection in one bay, all due for B inspection in another bay and all due for C inspection in a third bay. If during the work of inspection any part of the car is condemned so that it cannot be readily repaired in the bay it is shifted to what is called the shop bay, where there are facilities such as cranes, etc., for doing various kinds of heavier repair work.

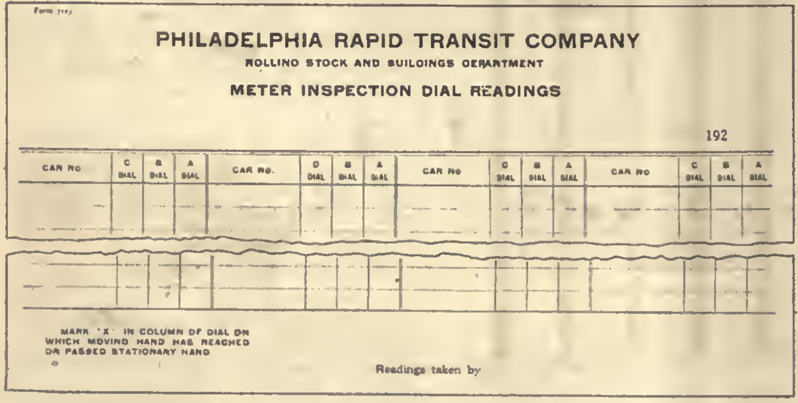
RESULTS SECURED

As shown by the comparison chart for 1920 as compared with 1919 the saving at the car induced by the meters has averaged 12 per cent in actual energy consumption of power distributed from the several substations feeding the West Philadelphia district. The mileage operated within the district fed by a certain group of substations was determined for the months affected both in 1919 and 1920. The reduction in energy consumption at the car for September as compared with May amounted to 8.8 per cent. The corresponding reduction at the substations for the West Philadelphia district was 5.9 per cent. As the mileage operated out of the Callowhill Depot was 31.3 per cent of the total for the district the saving for the Callowhill Division, which is equipped with meters, can be estimated at 19 per cent. The actual saving at the substation board was, of course, somewhere between 8.8 and 19 per cent. To be conservative the company estimates it at 10 per cent.

When operating on the kilowatt-hour inspection basis there is also a saving in maintenance labor due to the reduced number of times the cars come in for inspection. For example, in the semi-monthly period from Oct. 1 to 15 the average number of cars operated was 219. Under the former procedure these would have been inspected every day, a total of 3,285 inspections. Under inspection on the kilowatt-hour basis, the inspections actually made totaled but 602, of which 398 were for items called for by the A dial, 135 for those called for by the B dial and 69 for those called for by the C dial. The average interval between inspections was thus lengthened from one day to five and one-half days.

The reduction in cost of inspection under the new method is estimated at about 6 cents per meter per day. As the energy saving is about 19 cents per meter per day there is a total saving of approximately 25 cents per car per day. This is the net saving after deducting interest and depreciation on the cost of the meters installed, clerical work and overhead which accompany a general reduction in car-energy consumption.

As to the maintenance of the meters, up to the time this article was written no time had been spent on the inspection of the meters. Arrangements are now being made, however, to overhaul them, and this will be done annually hereafter. The total time necessary for the inspection will be about two hours per meter.



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PHILADELPHIA RAPID TRANSIT COMPANY

ROLLING STOCK AND BUILDINGS DEPARTMENT

METER INSPECTION DIAL READINGS

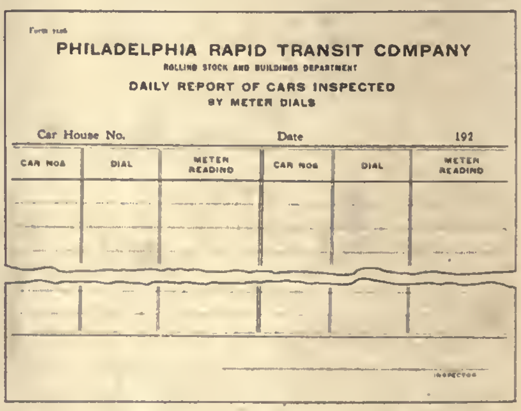
192

CAR NO	C DIAL	B DIAL	A DIAL	CAR NO.	C DIAL	B DIAL	A DIAL	CAR NO	C DIAL	B DIAL	A DIAL	CAR NO	C DIAL	B DIAL	A DIAL

MARK "X" IN COLUMN OF DIAL ON WHICH MOVING HAND HAS REACHED OR PASSED STATIONARY HAND

Readings taken by

FIG. 8—FORM USED IN REPORTING READINGS ON METER INSPECTION DIALS



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PHILADELPHIA RAPID TRANSIT COMPANY

ROLLING STOCK AND BUILDINGS DEPARTMENT

DAILY REPORT OF CARS INSPECTED BY METER DIALS

Car House No. Date 192

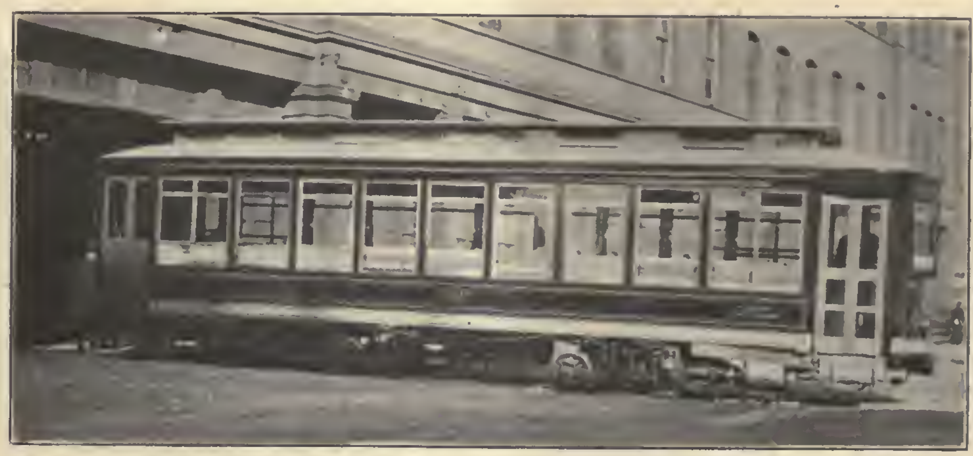
CAR NOS	DIAL	METER READING	CAR NOS	DIAL	METER READING

INSPECTOR

FIG. 9—FORM USED FOR SUMMARIZING RECORDS OF CARS INSPECTED DAILY

One-Man Cars Made from Open Type

Second Avenue Railroad, New York City, Is Reconstructing Some of Its Obsolete Open Cars Into a Particularly Attractive One-Man Type, with Comfort of Passengers a Great Consideration—The Reconstructed Cars Are Provided with Removable Sash So that These May Be Replaced by Screens During the Summer Season



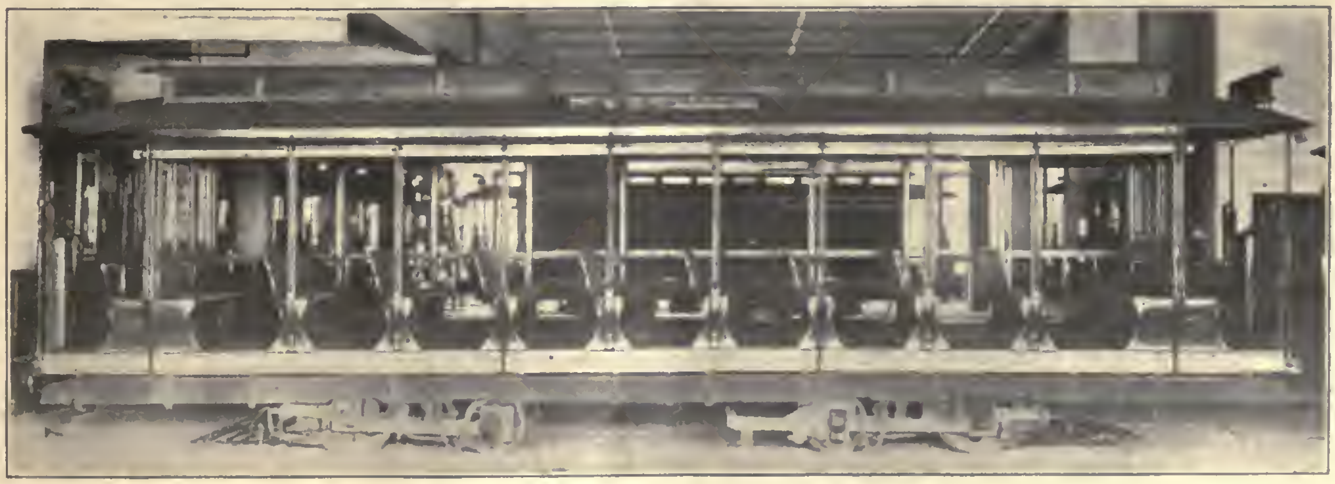
DOUBLE-TRUCK ONE-MAN CAR OF SECOND AVENUE RAILROAD

THE Second Avenue Railroad, New York City, had 100 open cars with twelve benches each which could be operated only in summer, and even then at great operating expense and danger from the multiplicity of accidents inherent to this type of car. The company was in need of more rolling stock of a modern character and decided to remodel these cars for one-man operation. Several have now been reconstructed and the enthusiasm with which they have been received by the patrons of the railway, together with the small cost of their reconstruction, has made the officials of the railway feel that they are an unqualified success. Accompanying illustrations show the process of reconstruction, starting with an open car as it was originally and leading up to the finished cars now in service.

In making this reconstruction the first operation is to remove all of the cross seats, part of the bulkhead, the running board and attachments at the sides, the old-type lighting fixtures and the various routing and destination signs. With the car thus stripped of its seats and operating equipment the reconstruction is carried out by using old parts wherever possible.

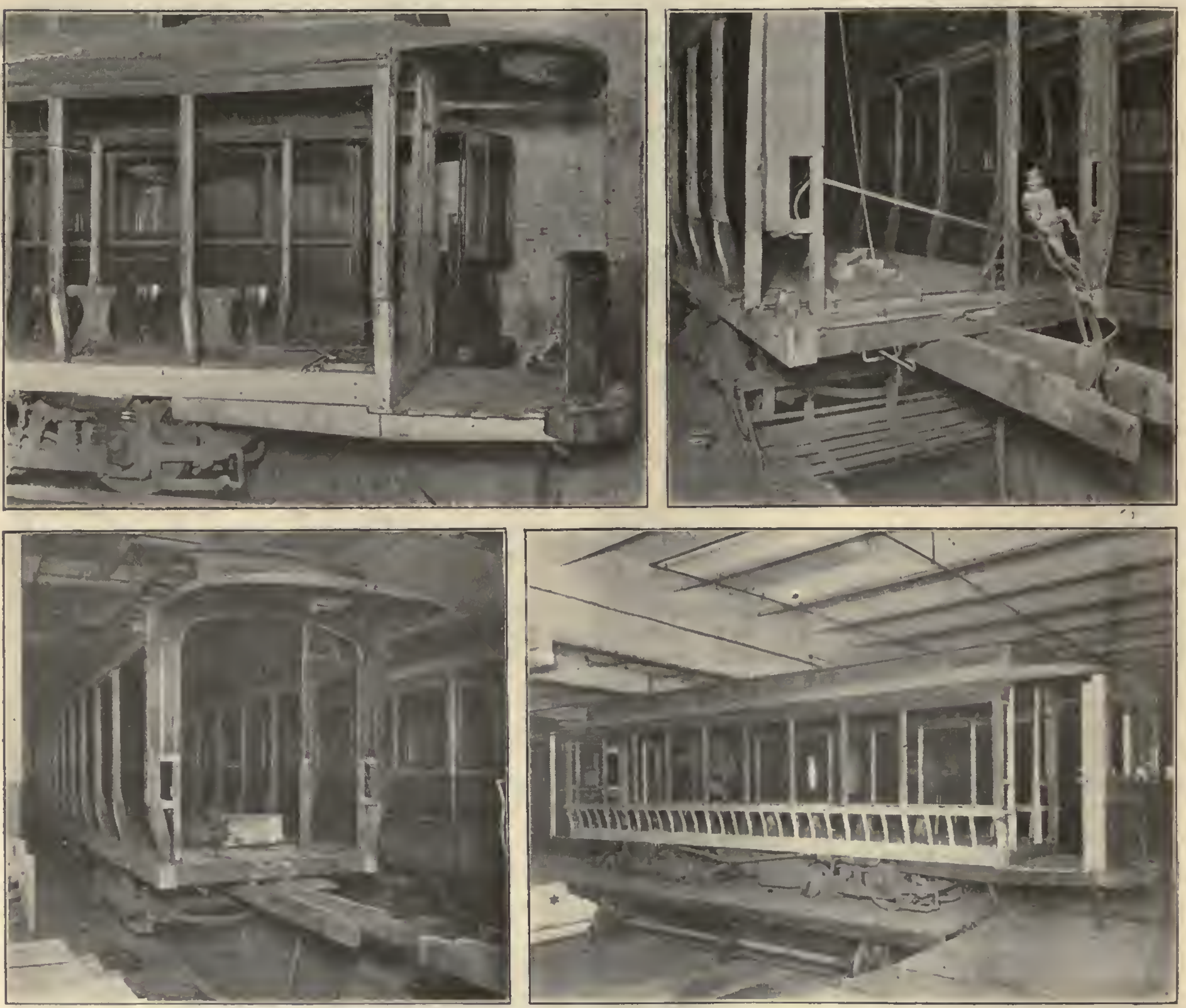
To provide for entrance to the platforms with a single folding step the platforms are dropped from their original position a distance of 7 in. For this purpose the side sills are cut off immediately in front of the bulkhead, and the center sills are cut down and reinforced to help support the new platforms. The side sills formerly consisted of oak, 7 in. x 4½ in., reinforced on each side with steel plates, the outside plate being 8 in. x ¾ in. and the inside plate 6 in. x ½ in. This construction is not changed along the center portion of the car, but at the ends two new oak side sills are added, 8 in. x 3 in. x 9 ft. long. In the reconstruction the platforms are lengthened 4½ in. at each end, making the total length of the reconstructed car 38 ft. 2 in.

The platforms are, of course, entirely inclosed, the construction used being the same as is standard on other types of closed cars for this railway. Folding doors and steps operated by National Pneumatic Company's



OPEN CAR BEFORE RECONSTRUCTION

door engines are installed so as to give a door opening of 30 in. In the construction a number of the corner posts were found to be considerably rotted at the lower ends, and these ends are replaced or reinforced to provide a strong construction. A concave bottom belt panel is installed along the entire length of each side and above this the opening between the original upright posts of the open car is filled in with natural-finish oak panels, the tops of these coming just to the tops of the seats. Above these panels sash are installed for the entire width of the openings between the original uprights of the open cars. These sash are arranged to drop a distance of 7 in. to provide for ventilation and are also constructed so that they can be entirely removed without difficulty and can be replaced by screens during the summer. The remodeled cars will thus be of a one-man convertible type, which apparently are the first of this type placed in service by any railway.



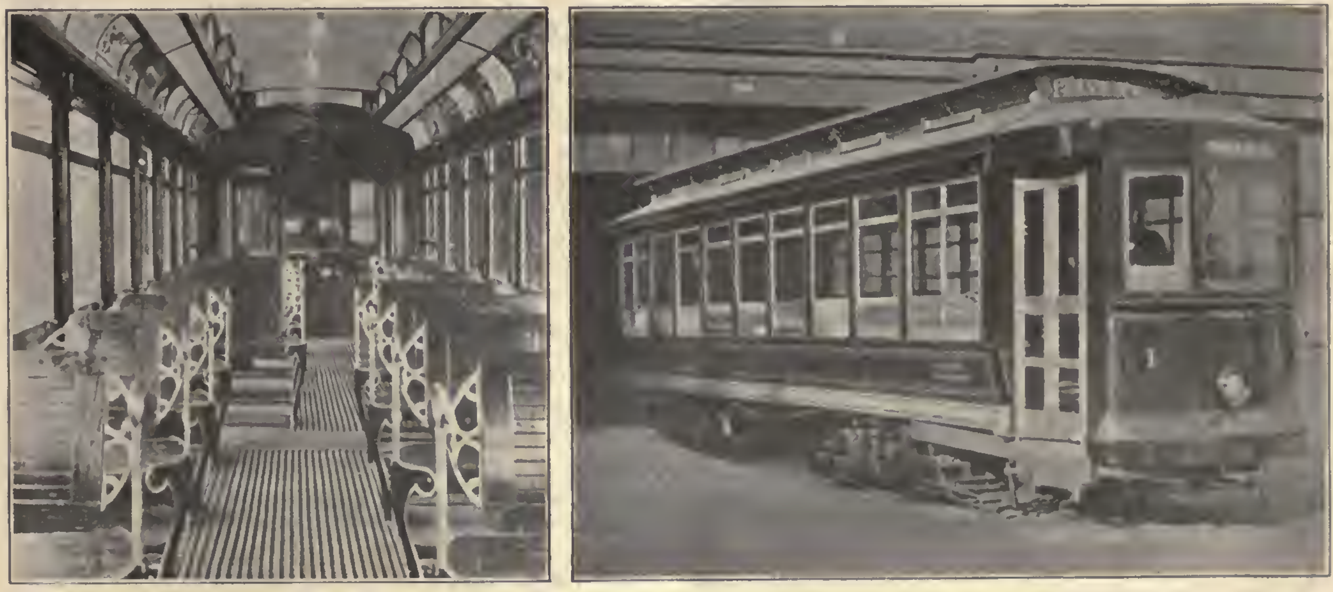
AT TOP, LEFT, RECONSTRUCTED DROP PLATFORM. TOP, RIGHT, END FLOORING AND PART OF BULKHEAD REMOVED AND CUTTING OF SIDE SILLS STARTED. AT BOTTOM, LEFT, SIDE SILLS CUT OFF AT ENDS AND CENTER SILLS TRIMMED TO ALLOW FOR DROP PLATFORM. FRAMING FOR BULKHEAD IN PLACE. BOTTOM, RIGHT, FRAMEWORK FOR CONCAVE BOTTOM BELT PANEL IN POSITION

The revised seating arrangement provides eight cross seats for two passengers each, eight cross seats for one passenger each, and four longitudinal seats, one at each corner of the car, to seat two passengers each, making a total seating capacity of thirty-two. All seats are made from the old cross seats, the end castings and other fixtures being used also. The inside end of each of the cross seats is provided with a grab handle made of cast iron and arranged for direct attachment to the end seat fixture. The seating arrangement provides a very roomy car, as the distance from center to center of the cross seats is 35 in. and the aisle width is 25 in. To provide for the aisle width selected seats for but one passenger were necessary. These are installed on opposite sides of the car in the two halves so as to provide a seating arrangement for balancing the load. The larger cross seats are 36 in. long and the smaller ones 19½ in.

LEG ROOM MORE NECESSARY THAN SEATS

It is evident from a consideration of these dimensions that several additional seats could be added if the same seating arrangement as that used in the Birney cars was employed, but C. E. Chalmers, receiver for the road, who is responsible for the design employed, says that he was a passenger on the cars of this road long before he was connected with its operation and that he has a lasting impression of uncomfortable seats and limited leg room. He considers the good will and comfort of the traveling public a far greater consideration than the addition of a few more seats to the cars, and in this reconstruction every attention has been paid to providing a neat, attractive car with as comfortable an arrangement as possible within the limitation of funds available for this reconstruction.

The floors as arranged in the first cars reconstructed have longitudinal floor strips in the aisles and cross floor strips between seats. It is the intention, however, in other cars which are to be constructed to use an Insulite-Mastic floor. This will be carried up a short distance along the sides of the car and at the corners, and will be rounded so as to provide for sanitary cleaning. With this arrangement it will be possible to flush out the interior of the car by turning on a hose without danger of damaging any equipment.



INTERIOR AND EXTERIOR OF RECONSTRUCTED CAR IN SERVICE

The heating equipment consists of sixteen Gold two-coil cross-seat heaters. These are of special design, as it was necessary to have a short heater for the single cross seats, and in order to make the equipment uniform the same type of heater was used throughout the installation. In the old cars sand boxes were installed under the end seats. In the remodeled cars, to provide for the bulkhead, these sand boxes were moved to a position under the longitudinal seats at the ends of the car. The original sand boxes were foot operated, but the new ones are arranged for air operation.

The original lighting arrangement used in the open cars consisted of three five-light clusters on the inside of the car with an additional circuit of five lights distributed on the platform and in the headlights, so that a total of twenty lamps were burning at one time. In the reconstructed lighting arrangement but half this number are burning at one time. A single row of six lights is installed down the center of the car and two additional lights are located on each platform. There is one light in each of the illuminated destination sign boxes and one light in each of the headlights. This makes a total of ten 23-watt lamps which are burning at one time.

The arrangement of the signs has been improved and made to correspond with the standard for the railway. The front glass at each end of the clearstory is lettered "2nd Ave. R.R. Co." In the original open cars an end advertising sign rack prevented light from passing through the end glasses of the clearstory. This has been done away with, so that as at present arranged the lights on the interior of the car illuminate these signs and also provide an attractive car which can be seen a long distance at night. An illuminated destination sign of a roller type, standard with the company, is installed over the front vestibule window and an additional sign reading "Enter at the Front" is placed in the side vestibule windows adjoining the entrance doors. The side panels just to the rear of the entrance doors are lettered "Please Have Exact Fare Ready." The additional lettering used on the car has been made as simple as possible and still is arranged to provide an attractive appearance. A monogram has been substituted for the lettering of the name of the company, which previously extended along the side of the car. The number of the car is placed directly beneath the monogram on the sides and at each end of the car on the right-hand side of the dasher.

The signal installation consists of a push button installed on the upright post between each pair of windows along the sides, with two additional push buttons at the ends of the car. This makes a total of eighteen buttons. Buzzers are provided for signaling the operator. The entire signal installation is of the Consolidated line-voltage type.

In painting the car particular attention has been given to making it attractive and clean. The outside of the car is finished with Pullman green and white, with natural finished oak panels underneath the windows. The interior is finished in cherry and white, with some additional gold striping to improve the appearance. The bird's-eye headlining has been refinished with white enamel. This provides better lighting and also gives an attractive appearance. The seats are finished with a cherry stain, and in fact all of the other interior woodwork and fittings are finished with this cherry stain. Even the cover of the controller, which is of wood, has this. The seat castings, which receive the roughest usage of any part of the equipment, are painted black with gold striping. The floor is painted green.

The original open cars were provided with air brakes, so that the same air-brake equipment has been retained, as well as the original control equipment. In the rewiring of the car it was found possible to use the same cable for the length of the car, as this was long enough to drop down underneath the lower platform and still reach the controllers.

The control is interlocked with the doors, so that the car cannot be started until the doors are closed. The National Pneumatic door engine is installed over the top of the doors and is operated pneumatically from a valve just to the left of the motorman's brake valve. In order to give greater platform space and provide room for the entrance and exit of passengers a drop brake handle is used. On entering the passengers deposit their fares in a Johnson farebox, which is located just to the right of the entrance opening and within easy reach of the operator.

The cars as reconstructed are 38 ft. 2 in. long and weigh approximately 25,000 lb. completely equipped. The cost of reconstructing the first cars has been approximately $800 each. At present the Second Avenue line of this railroad is completely equipped with one-man operated cars, which operate between the Harlem River and Tenth Street and Broadway. A four and one-half-minute headway is maintained during the greater part of the day with a two and one-quarter-minute headway during the rush-hour period. The reconstructed cars are proving very popular with the public, and the number of passengers carried by this line is increasing rapidly.

A. I. E. E. Holds Ninth Midwinter Convention

A Number of Important Papers on Power Distribution Were Read, and Motion Pictures of C'rcuit Breakers, Switches, Current Transformers and Fuses Under Short Circuit Were Shown at Opening Session

AS THIS issue of the ELECTRIC RAILWAY JOURNAL goes to press the American Institute of Electrical Engineers is in session in New York City at its midwinter meeting, a convention which has come to occupy an important place in the organization's activities. The program included several papers covering matters which have application particularly in electric railway power distribution. These represented part of the work of the Institute's technical committees which handle the highly specialized subjects in the several divisions of the field of electrical engineering.

The convention opened on Wednesday evening with the presidential address of A. W. Berresford, vice-president Cutler-Hammer Manufacturing Company, Milwaukee, Wis. Preceding the opening session the delegates spent the afternoon in visiting local power plants and other points of engineering interest.

In his address President Berresford noted first the tendency of specialists toward segregation, and said that if the A. I. E. E. had not previously been formed it would have been organized at this meeting due to the necessity for conference on technical problems. He then defined the real professional engineer as one who has caught the vision of the value of achievement for its own sake, of the importance of the work done rather than its return to the worker. The standing of electrical engineering as a profesion, he said, is illustrated by the devoted work of the A. I. E. E. committees.

PAPERS ON CIRCUIT BREAKERS AND SWITCHES

The papers of Wednesday evening had been prepared and were presented under the auspices of the protective devices committee, D. W. Roper, superintendent street department Commonwealth Edison Company, Chicago, Ill., chairman. H. R. Woodrow, Stone & Webster, Inc., Boston, Mass., presented the report of the sub-committee on oil circuit breakers and switches. This embodied the results of a questionnaire on oil switch requirements, and covered rated voltage, rated continuous current-carrying capacity, rated momentary current-carrying capacity and rated interrupting capacity. The committee made suggestions as to design under these heads.

REMARKABLE MOTION PICTURE OF SWITCHES AND FUSES IN ACTION

Following the reading of Mr. Woodrow's paper, Philip Torchio, chief electrical engineer New York Edison Company, read a paper on "High-Current Tests on High-Tension Switch Gear." This was accompanied by motion pictures of the apparatus "under fire," the switches being clamped in the closed position and subjected to short-circuit currents of great magnitude. The tests, which covered several varieties of circuit breakers, fuses, etc., had been conducted during 1918 and 1919 by the Edison company engineers with the active co-operation of manufacturers. In the tests, for the first time a synchronized motion-picture machine and an oscillograph were coupled to reproduce the coincident actions of the apparatus tested and the variations in voltage and current in the circuit.

The most striking feature of the exhibit was that considerable arcing of the closed switches occurred under short circuits, which was caused by the opening of the main and arcing contacts due to the mechanical force resulting from the high current.

In the discussion which followed the reading of the papers, the characteristics of fuses and circuit breakers were pointed out, one speaker telling of a fuse in which the fusible wire is in part inclosed by cement blocks distributed along its length, with intervening exposed sections of the wire. This was said to operate successfully, the exposed wire going first and the inclosed wire later, the metal of the latter being absorbed by the cement. The carbon tetrachloride fuse was also mentioned. One speaker traced briefly the history of the circuit breaker, showing how the rapid increase in power-plant capacity had imposed severe requirements upon this vital element of the equipment.

On Thursday a number of papers relating to power cable problems were read. Some of these will be abstracted in a later issue of the ELECTRIC RAILWAY JOURNAL.

It is now possible to obtain from the Bureau of Standards bulletins Nos. 395, 396 and 397 in its series of scientific papers. These cover respectively the relation of the high-temperature treatment of high-speed steel to secondary hardening and red-hardness, the thermal and physical changes accompanying the heating of hardened carbon steels and a study of the relation between the Brinell hardness and the grain size of annealed carbon steels.

American Engineering Council Reports Progress

L. W. Wallace Elected Permanent Executive Secretary at Meeting at Syracuse on Feb. 14—Committee Organization and Assignments Crystallized—President Hoover Outlines Industrial Survey

AMERICAN Engineering Council held its second regular meeting at Syracuse on Monday, Feb. 14, at which time considerable progress was made in perfecting the organization of the committees and committee work. Also the appointment of the permanent secretary was agreed upon.

In the evening a Hoover dinner was given at the Onondaga Hotel to the members of American Engineering Council, of the Council of the A. S. M. E. and of the Technology Club of Syracuse.

The permanent committee on the elimination of waste in industry as appointed by President Hoover consists of the following members: J. Parke Channing, mining engineer, New York, vice-president American Engineering Council and member A. I. M. & M. E., chairman; Dr. Ira N. Hollis, president Worcester Polytechnic Institute, past-president A. S. M. E.; L. W. Wallace, Baltimore, member A. S. M. E., member and president Society of Industrial Engineers, secretary American Engineering Council; H. R. V. Scheel, assistant treasurer Brighton Mills, Passaic, N. J., member A. S. M. E.; L. P. Alford, editor *Management Engineering*, New York, vice-president A. S. M. E., director Society of Industrial Engineers; George D. Babcock, Peoria, Ill.; F. G. Coburn, Bethlehem Shipbuilding Company; Morris L. Cooke, consulting engineer, Philadelphia, member A. S. M. E., Taylor Society and Society of Industrial Engineers. Harrington Emerson, consulting engineer New York, member A. S. M. E. and Society of Industrial Engineers; E. E. Hunt, New York, member Taylor Society; C. E. Knoeppel, industrial engineer, New York, member A. S. M. E. and Society of Industrial Engineers; Robert Linton, mining engineer, Montana, member A. I. M. & M. E.; Fred J. Miller, past president A. S. M. E.; J. H. Williams, New York, member Taylor Society; Robert B. Wolf, New York, vice-president A. S. M. E.

Mr. Hoover, president of American Engineering Council, is also a member of the committee. Mr. Hoover is a member A. S. C. E. and A. S. M. E. and president A. I. M. & M. E. The committee has already started work and will put into operation from the New York and Washington headquarters of the council a nationwide plan of study. This is probably the most ambitious movement in the solution of economical problems which has ever been undertaken by American engineers.

The council has adopted a definite program encouraging the development of local engineering organizations, and in line with this policy will expect local organizations to take a good deal of responsibility in their localities in the various pieces of work which American Engineering Council undertakes.

The council is also working toward a worldwide coördination of the engineering associations. It has changed its committee on Russian affairs into a committee on international relations.

One important piece of work was the election, by unanimous vote, of Lawrence Wilkerson Wallace to be secretary of the council. Mr. Wallace succeeds L. P. Alford of New York, who has been acting secretary since the formation of the council last November.

Mr. Wallace was born in Austin, Texas, August 5, 1881. He was graduated from the Agricultural and Mechanical College of Texas in 1903 with the degree of B.S. in Mechanical Engineering and received the degree of M.E. from Purdue University in 1912. From 1903 to 1906 he served a special apprenticeship with the Santa Fé Railway and was a member of the Purdue faculty from 1906 to 1917, becoming head of the department of railway and industrial management. During this period Mr. Wallace conducted researches and did consulting work in railway mechanical engineering and factory management. For several years he investigated fire losses from locomotive sparks and gave expert testimony in many fire cases.

L. W. WALLACE

Mr. Wallace is an author of technical works and his volume on "Car Design" is used as a textbook as well as generally by designers. He also has written special instruction books for railway educational departments and papers on engineering and management topics before railway and management societies. He was formerly assistant general manager in charge of production of the Diamond Chain & Manufacturing Company of Indianapolis. More recently he has been director of the Red Cross Institute for the Blind in Baltimore.

Mr. Wallace is a member of the American Society of Mechanical Engineers and the vice-chairman of the society's management section. He is now serving his third term as president of the Society of Industrial Engineers.

The temporary headquarters of the council in the Engineering Societies Building, New York City, will soon be transferred to Washington, where the council has established permanent national headquarters in the McLachlen Building.

The council gave formal approval to the action of the committee on procedure requesting that President Harding put an engineer on the Interstate Commerce Committee. The committee was authorized to name six qualified engineers when requested to do so. Activity in behalf of a National Department of Public Works will be continued by the council through the public affairs committee. It was recommended that engineering efforts be extended to the whole question of government reorganization.

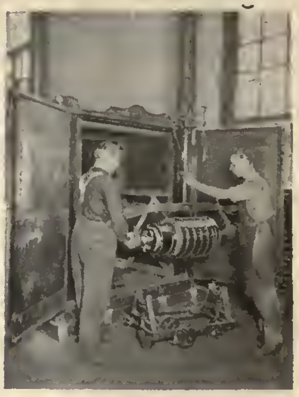
The plan for the registration of engineers as presented in the council's report was indorsed and the appointment of another committee was authorized. The Russian affairs committee was made a new committee on international relations.

The council decided to recommend to President Harding that an engineer be appointed assistant secretary of war. No action was taken relative to the national civic federation, fuel conservation or merchant marine committee appointments. The committee on public affairs was authorized to recommend the congressional appropriation to investigate deeper waterways.

At the dinner in the evening President Hoover delivered an address outlining his ideas on the work of the committee on the elimination of waste in industry.

Shop, Track, Power and Line

These Articles and Ideas Are from Men on the Job Who Find Special Applications and New Methods an Incentive for Greater Effort — If You Have Something Good Pass It Along



Convenient Shop Call System

WHEN a call comes for a shop foreman while he is attending to some duty in the inspection shop, overhauling shop, storage yard or other place connected with his department the problem of locating him is sometimes a serious one. Many railway shops use a loud-sounding gong or whistle as a signal and sound a different number of blasts or signals to designate different department heads and indicate that their presence is required in the office. With such a system the person signaled must go to the office to learn what is wanted, and as a loud alarm is necessary to reach all parts of the shops or yards this disturbs workmen and distracts them in the performance of their duties.

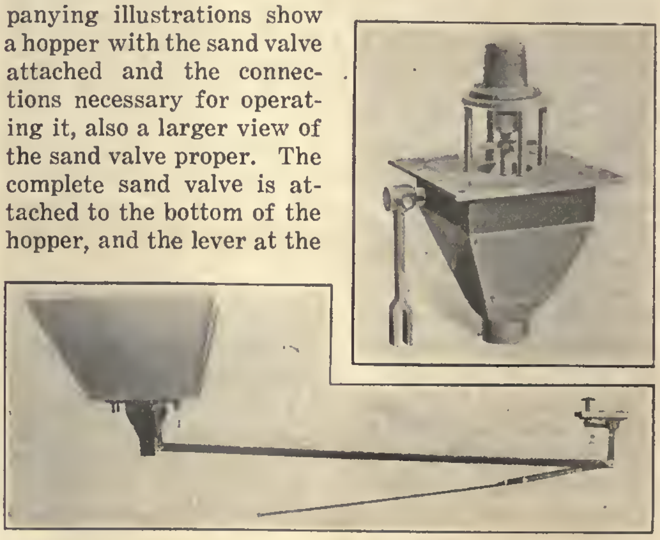
The Third Avenue Railway, New York City, has a shop call system in its Sixty-fifth Street shop that has proved very satisfactory for such service. Telephones have been located at various convenient points throughout the shop and small whistles electro-pneumatically operated are scattered throughout the building. These whistles are operated from the telephone switchboard by pressing a key. As they are connected in parallel, they all sound the same signal and the person called can find out what is wanted or can answer any outside call by going to the nearest telephone. By this arrangement the signaling whistle can be made very small so as not to prove a disturbing factor for other workmen.

WHISTLE AND MAGNET VALVE FOR SHOP CALL SYSTEM

The mechanism for operating the various whistle signals consists of a magnet valve taken from an old electro-pneumatic switch group and connected to the whistle. When this magnet valve is energized electrically air is admitted to the whistle pipe and so sounds the signal. The magnet valve, together with the whistle and piping, is mounted on a bracket high up on the wall so as to be out of reach of employees and in a location where the signal will be easily heard. With this system in use a man need no longer be tied down to his desk. If his work takes him on frequent visits to other departments he can go with an easy mind, knowing that if he should be needed he can be readily located and that he can communicate with the office without making it necessary to walk the entire length of the yards and shops to find out what is required.

Mechanical Sander for Safety Cars

A FOOT-OPERATED mechanical sander has been put on the market by the Nichols-Lintern Company, Cleveland, Ohio, which advocates its use as a safety feature on the safety car, to insure the sanding of the track even if the air pressure fails. Accompanying illustrations show a hopper with the sand valve attached and the connections necessary for operating it, also a larger view of the sand valve proper. The complete sand valve is attached to the bottom of the hopper, and the lever at the side is pulled by the action of the pedal. Through a cam it causes a vertical movement of the valve which is attached to the threaded stem, thus making an opening for the sand to flow through. The pronged part of the valve, through its up-and-down movement, prevents bridging of the sand. A strong spring is located under the top cap. This spring closes the valve when the foot



SAND HOPPER WITH FOOT-OPERATED SAND VALVE MECHANISM pressure is released. The working mechanism is completely inclosed within the valve and the cam is within the sand hopper, protected from any outside influence, thus insuring against the rusting of the moving parts.

Fighting Snow in Winnipeg

SOME of the snow-fighting equipment used by the Winnipeg Electric Railway, Winnipeg, Man., is shown in the acompanying illustrations. Snow conditions in Winnipeg are rendered especially trying due to the extremely low temperatures encountered and the dryness of the climate. Heavy winds usually accompany the low temperature and the snow, which is light and dry, drifts readily. This makes it very difficult to keep the tracks clear of snow and as a result it is necessary to operate the sweepers more miles per year than in cities where climatic conditions are more favorable. While the snowfall in Winnipeg is not as heavy as at other points in Canada, yet the sweeper mileage is considerably greater than on most systems of the size of the local railway.

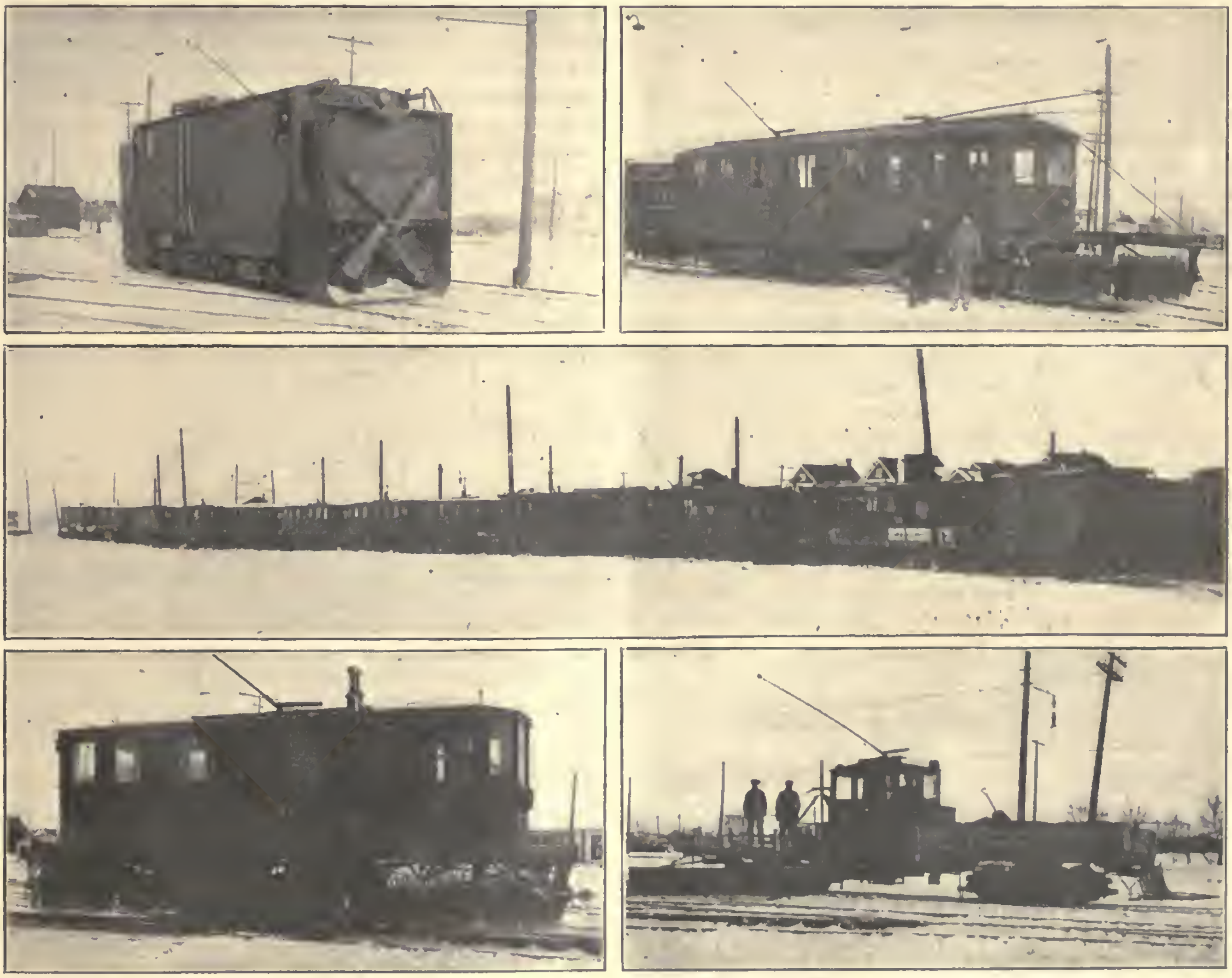
The snow-fighting equipment proper used in Winnipeg consists of one rotary plow, one large double-end sweeper and nine double-end single-truck sweepers. This equipment is all of McGuire-Cummings make, imported from the United States. In addition to this equipment the company also has some auxiliary equipment made in its own shop. This consists of one work car, which is equipped with a 14-ft. wing and is operated by air control for clearing back the snow. This wing as attached to a flatcar is shown in one of the illustrations. Other cars operating on suburban lines are equipped with 14-ft. nose plows attached to the trucks and arranged for lowering and lifting by the motorman from his cab.

Life of Track Files Increased by Acid Sharpening

FILING new rail joints on the lines of the United Railroads of San Francisco has been done for many years with Vixen files, a type whose manufacture was recently discontinued. Inquiry developed the fact that the nearest substitute for these files would cost $18 each.

Some experiments were thereupon made with the acid sharpening process for reclaiming the dulled Vixen files on hand. It was found that if the dulled files were soaked in dilute sulphuric acid for eight hours, the cutting edges would thereby be sharpened to the extent that the file was good for about 30 per cent of the amount of service that could be obtained from a new file.

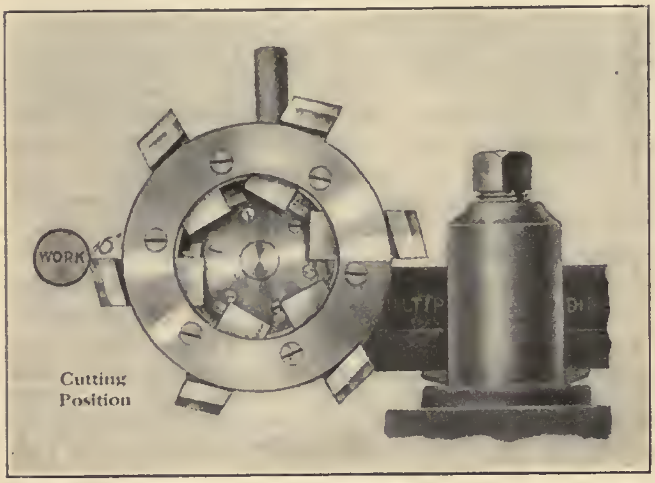
The acid used for the purpose was chemically pure sulphuric acid diluted with twice its volume of pure water. Watertight redwood boxes were found to be the most convenient containers in which to immerse the files.



TOP, LEFT, LARGE ROTARY SNOWPLOW. TOP, RIGHT, DOUBLE-TRUCK, DOUBLE-END SWEEPER. CENTER, A LINE OF SNOW-FIGHTING EQUIPMENT IN THE STORAGE YARDS. BOTTOM, LEFT, SINGLE-TRUCK, DOUBLE-END SWEEPER. BOTTOM, RIGHT, WORK CAR WITH 14-FT. WING ATTACHED

New Type Threading Tool

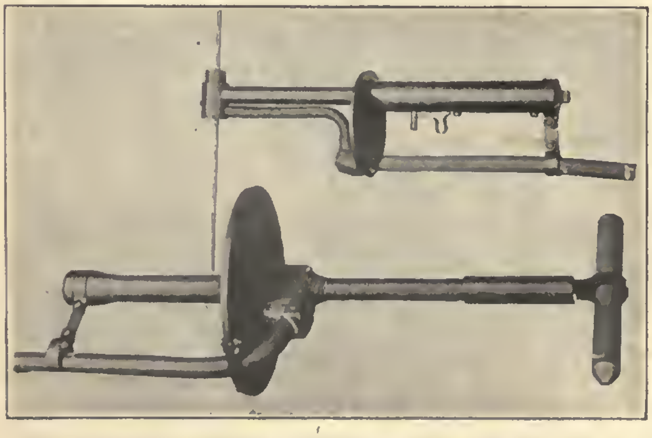
THE Cruban Machine & Steel Corporation, New York, N. Y., is placing on the market a new type of multiplex threading tool. This consists of a cutter turret, in which are mounted six cutting tools arranged so that as the turret is rotated each succeeding knife takes an additional depth of cut, and one complete rotation of the turret is sufficient to cut any thread up to No. 12 pitch without additional adjustment. The cutter turret is attached to a cross-slide which is fastened to the toolpost of the lathe. Should additional depth be necessary, this can be taken care of by adjusting this cross-slide. The turret is provided with a pin handle and at the end of a cut a pull on this handle disengages the cutting knife from the work and sets the succeeding knife in proper position for taking the additional depth of cut necessary. Each knife is held firmly by a locking screw at the bottom of the knife.



MULTIPLEX THREADING TOOL

Convenient Electrode Holders

OF THE two forms of electrode holders illustrated, the upper is designed for metallic electrodes while the lower is for graphite electrodes. In each the cable which conducts the current to the electrode is carried outside the handle, so that a small-sized cable can be used without causing the handle of the holder to become heated to an uncomfortable temperature. The metallic electrode is held by means of a plunger which passes through the tubing and is actuated by springs. The stub end of the electrode can be released by pulling on the trigger shown immediately under the handle of the electrode holder.



HOLDERS FOR METALLIC AND GRAPHITE ELECTRODES

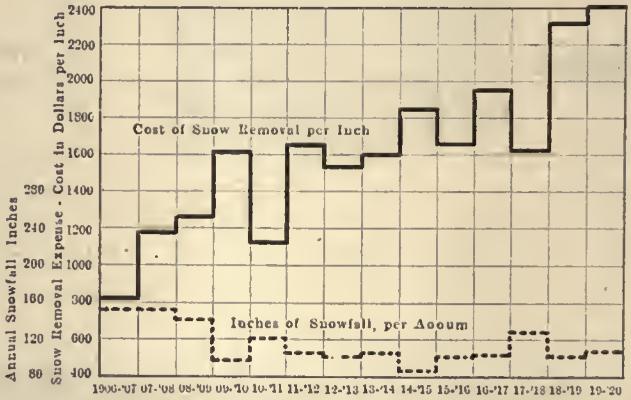
The graphite electrode can be readily removed and replaced by rapping the two jaws, which are merely slipped back into the tubing. These jaws consist of two pieces of cold-rolled steel bent into proper curved shapes to fit the electrodes and are forced back into the tubing, which clinches them together, causing them to hold the electrodes securely. If these jaws should become burned while in service they can be quite readily replaced by forming up a couple of jaws from steel or iron.

Registers Replace Ticket Agents

THE Brooklyn Rapid Transit Company has purchased fifty Rooke automatic registers for use in collecting fares on the rapid transit lines running between Sheepshead Bay and the Stillwell Avenue terminal at Coney Island. During the winter season shuttle service is used between these two points and the ticket agents at stations intervening that are ordinarily required have been done away with through the use of these registers. The fares are collected by collectors who board each train as it leaves the terminal and collect all fares while in transit. This method is working out very satisfactorily.

Snow-Removal Costs in Montreal

COL. J. E. HUTCHESON, general manager Montreal Tramways, in his paper on "Practical Operation of a Service-at-Cost Contract," presented on Jan. 31, 1921, at the seventeenth annual convention of the Canadian Electric Railway Association, included among other operating costs some figures on the cost of snow removal from the company's right-of-way for the past fourteen years. These figures form the basis of the accompanying chart. During the period covered the average snowfall per season was about 115 in. and the average cost of removal per inch was $1,615.



SNOWFALL DATA FOR MONTREAL, QUE.

In investigations made in England with regard to the loss in weight of overhead electric railway contact systems by corrosion and wear it has been found that the heaviest corrosion was on a section of the line over which both steam and electric trains were worked. There the loss averaged approximately 0.82 per cent per year. On a line where there was no steam travel tests indicated that the loss by wear was closely proportional to the density of electric train traffic over the line, and in spite of the very heavy service over this line the wear averaged but 0.3 per cent per annum.

Tendencies in Safety Car Design

Comments on a Previous Article, Outlining Changes in Construction that Have Been Made, Show Diversity of Opinion Regarding Their Desirability—Other Articles on the Same Subject Follow the Letters

SEVERAL letters and other short articles relating to the safety car having been scheduled for publication in this issue of the ELECTRIC RAILWAY JOURNAL, they are gathered together under the above general caption for the readers' convenience.

Letters to the Editors

J. G. BRILL COMPANY
PHILADELPHIA, PA., Feb. 5, 1921.

To the Editors:

In the issue of the ELECTRIC RAILWAY JOURNAL for Jan. 15, 1921, page 127, there is published a staff article on the "Trend of Safety Car Construction" which is not only misleading to those unfamiliar with the entire question of the standardized Birney safety car, but is also liable to create such erroneous impressions as will be detrimental to both the manufacturers and the railway operators themselves.

Since the standard Birney safety car was designed there have been many suggestions made which, in the opinion of those making them, would improve the standard construction, but in most cases the increased weight would more than offset any advantages which might be obtained. In some cases when safety cars are ordered the specifications are made to read "standard Birney safety cars, except ——," but it must be borne in mind that where the weight of the car was increased the saving in power, increased acceleration and other advantages of the standard car suffered. Of the twenty-three changes or departures from the standard Birney safety car reported, most of them were included in a few cars and all were not included in all of the cars purchased by half the companies sending in reports, as might be construed from the article in question. Also, an analysis of these departures or changes from the standard specifications reveals that at least 50 per cent of the changes are either now included in the standard car or are essentials determined by climatic conditions which could not very well be retained as a standard. Take, for instance, the heaters. It is illogical to expect that a standard number of heaters could be furnished in Birney safety cars regardless of the climatic conditions. Then, again, in severely cold regions double floors or storm sash may be necessary and should be furnished, but they would involve superfluous weight in warmer climates.

As to the heavier truck, this was adopted some time ago and is adequate for the service. The light-weight truck was designed to carry a limited load, but after a time it was considered advisable to provide a truck with greater carrying capacity than the limited load of the lighter truck.

It is to be expected that the standard Birney safety car will from time to time show progressive improvements in the way of refinements, which will be incorporated at such times that the advantages of quantity production and standardized parts will not be lost. Some refinements have been made, but the general plan, length, width and other dimensions of the standard car remain the same as originally designed after an exhaustive study of the requirements of street railway transportation. The statement in the sub-heading of the article referred to, that "A review of the more recent changes in safety car design points toward the development of a type with increased capacity, etc.," is not borne out by the facts, which are recognized in the last paragraph of the article by the statement, that the "most general feeling in regard to standardization on this particular car seems to be that the present general dimensions of length, width, height and general capacity are satisfactory." I know that you desire to present the standard Birney safety car to your readers with the correct perspective, and for this reason the publication and spirit of this letter will be appreciated.

W. H. HEULINGS, JR.,
Vice-President and General Manager of Sales.

MEDFORD, MASS., Jan. 27, 1921.

To the Editors:

I have been interested in the articles which have recently appeared in the ELECTRIC RAILWAY JOURNAL with reference to the tendencies in design of safety cars. From the expression of these articles it is apparent that a number of street railway men do not give sufficient regard to the conditions which confront the street railway today.

The basic consideration in car design should be that the electric railways no longer have a monopoly of the urban passenger business. The successful car must be designed to meet the competition of the bus.

Barring infrequent stop service over reserved right-of-way passenger transportation may be carried out in two ways, viz.: (a) By transporting passengers in small groups at frequent intervals at moderate speeds, or (b) by transporting passengers in large groups at less frequent intervals at slower speeds. Service (b) is often called mass transportation.

I look forward to the time when, by the equalization of paving and tax burdens, adjustments of fare, and other means, service (b) may be offered to the public at rates which will in themselves take the majority of riders from competing buses, just as service (a) by its frequency and speed is taking riders from its competitors. But in the larger cities service (a) and service (b) cannot be given at the same time over the same tracks. It is obviously impossible to run a 9 or 10 mile-per-hour safety-car schedule over tracks which carry a number of large cars or trains operating at 7 or 8 miles per hour.

It is, therefore, imperative that car design be preceded by a decision as to the service in which the proposed car is to be used. Is the car to be used for mass transportation at slow speeds or is it to be used for service with small units at moderate speeds? Mass transportation requires large cars, trailers or multiple-unit trains. Moderate speed service requires buses, trackless trolleys or cars with speed characteristics at least equal to those of the present safety car.

The ability of the standard safety car to operate at bus-competing speeds is the result of a high ratio of motive power to car-weight and a low ratio of stops to car-miles. Any increase in the weight of the standard car will require larger motors than are now used. To operate the larger motored car at the better schedule speeds of the present car will increase operating expenses and fixed charges more than $1,000 per car per annum; a prohibitive amount. The increased weight will thus force a decreased schedule speed, which in turn will increase platform expense and investment in cars while driving business to our competitors, and we will head back toward the condition of heavy cars and empty seats, which we hope is forever behind us.

Let us devote our energies rather to reducing the weight of the present standard car, for which effort we will be rewarded by decreasing ratios of operating expenses and investment to gross earnings.

The case against increasing the capacity of the safety car is a strong one. The wisdom of Mr. Birney's selection of thirty-two as the seating capacity of the safety car has been borne out by experience. Observant operators know that independent of congestion within the car an increase in the maximum safety car load beyond about fifty passengers reduces the number of passengers carried per car-mile. The larger loads increase the number and duration of stops, thus decreasing the schedule speed and trips per car by an amount more than sufficient to offset the increased car loading. It should be remembered that even with the roomy platforms of large prepayment cars the time taken by each passenger to board or alight increases as the number of passengers boarding or alighting exceeds three or four per stop.

If one must carry more passengers per car than can be carried comfortably by the present safety car he may use a larger car, but the increase in car capacity which must be made to secure an increased loading per car-mile is so great that the service given by the larger car will be slow-speed, mass-transportation service instead of moderate-speed, safety-car service.

A SAFETY CAR FAN.

Safety Car Construction in Canada

Cars Embodying Many Changes from the Standard Birney Type of Construction Are Exhibited at the Car Works of the Ottawa Car Manufacturing Company, Ltd.

AT THE convention of the Canadian Electric Railway Association held in Ottawa, Ont., on Jan. 31 and Feb. 1, safety cars formed one of the principal topics of discussion and many of the attendants took advantage of the close proximity to the Ottawa Car Manufacturing Company's works to inspect some new safety cars which this company has under construction. Some of the changes for Canadian conditions which are embodied in these cars and others being considered were outlined by W. H. McIntyre, general manager, in a circular letter distributed at the convention. The following is an abstract of this letter:

Since the introduction of the Birney safety car there have been certain changes and improvements which our engineers have taken into consideration. These provide for increased safety to the public, reduced maintenance, improvement in appearance of the car, and changes to meet the climatic conditions of Canada. Our company is constructing a one-man car which we feel will be more suitable for Canada than the one now built in the United States. Improvements embodied include:

1. Increased strength of various structural parts.
2. Increased thickness of side sheathing.
3. Double floors with lining between.
4. Agasote headlining.
5. Agasote waist coating belt rail to floor.
6. Storm sash.
7. Wheels 26 in. in diameter.
8. Rubber cushion between underframe and truck.
9. Brake levers provided with safety jaws, not clevices as now used.
10. Additional heaters.
11. Seating arrangement changed.
12. Leather covered seats with the Ottawa flat spring, eliminating all coil springs.
13. Automatic spring bumper.
14. Safety panels for switches.
15. All air-brake piping installed inside the car where practicable.
16. New lighting arrangements.

Other features which are being considered for adoption on our Canadian safety car will increase capacity, provide greater comfort and convenience and additional safety. We have what we term a heavyweight one-man safety car which weighs 24,000 lb. This car is designed for use where existing headways are three minutes or less and where traffic is heavy. The design of this car includes a longer platform at the front, the use of double doors for entrance and exit of passengers, the employment of platform railing to separate incoming from outgoing passengers, the use of longitudinal seats at the ends, including all safety features with the National Pneumatic Company door engine. The equipment is so arranged that the motorman can operate the doors and steps singly if desired. This car has been constructed along the lines described in the issue of the ELECTRIC RAILWAY JOURNAL for Jan. 15, 1921, page 130, for a one-man car of somewhat larger proportions and seating capacity than that of the standard Birney car. This car was designed by the Ottawa Car Manufacturing Company a few years ago and there are now fifteen such cars in use.

We believe this is an opportune time for the railway managers of Canada to consider the standardization of street railway cars in Canada, which in the past has been overlooked.

Manager Prefers Single-Door Safety Car

Experiment Showed that Fares Are Lost in Rush Hours with Two-Door Type of Car—Also that Convenience of Passengers Renders Use of All Cross Seats Best

IN CONNECTION with an article in the Jan. 15, 1921, issue on "Trend of Safety Car Construction," in which a variety of changes made or suggested were discussed, the following experiences and conclusions of one safety car user are pertinent:

The first safety car run by this railway, which operates in a small city, but with some very dense intermittent traffic, was of the standard single-door type. Following some experience with this car the management thought it would be an improvement if the front platform was provided with both entrance and exit doors. Consequently a car of the double-door type was installed. It was not long before the company found that the theory of the double door was not working out in practice. Many fares were lost in the busy hours by reason of both doors being open, one for entrance and one for exit. Before the operator could close the exit door on the departure of the last passenger boarding passengers would force their way in through the exit aisle and seat themselves without paying fare. The operator, of course, would go back and try to get all missed fares. This meant the loss of three or four minutes of valuable time, annoyance to those who had already paid fare and several fares lost in any event.

The company next tried the plan of opening the entrance door only after the exit door had been closed. This proved to be an even greater waste of time than the first method. Finally, after timing the loading and unloading of passengers on both types of safety cars, the management learned that the single door was faster than the double doors, with the further advantage that the single-door car allowed no fares to slip by. The company now operates with the single-door system only.

Another interesting experience was in regard to the seating plan. One car had longitudinal seats in the corners to minimize congestion at the ends, while the other car had cross seats throughout. It was noted that passengers on the longitudinal-corner-seat car found it altogether too easy to crowd within the well formed by these seats. On the other hand, the very fact that it was not so convenient to stand near the bulkhead line of the cross-seat car led passengers to go back. The operator also had a greater inducement to remind passengers that they should move backward, for it did not take much of a standing load at the front end to crowd him uncomfortably. Hence the management concluded that the all-cross-seat car was the better in practice after all.

Moralizing a bit upon his experiences, the manager of this company says: "It seems to me that many companies are losing sight of the principle on which the safety car was designed, namely, that a large number of small cars on short headways should replace a small number of large cars on long headways. It seems to be the tendency to try to increase the size of the car and its carrying capacity, which will spoil the very principle for which the car was designed. The safety car is supposed to handle fifty persons as a full load. When the traffic is dense enough to exceed this load more cars are necessary. I believe that it has been proved that even on the congested lines in big cities two Birneys can replace one double-truck car and handle 30 per cent more people in less time. I think that if the various companies would bear in mind the principle on which the safety was designed there would not be so much inclination to enlarge the car and make other changes."

Heavy Short Circuit Kinks Third Rail

A RECENT derailment on the Northwestern Elevated Railroad, Chicago, resulted in a short circuit so violent that it threw the third rail out of alignment for a considerable distance from the point of derailment. Some work was being done on one of the express tracks and both express and local trains were being routed over the local track. In order to provide adequate feeder capacity for this track, therefore, four feeder sections had been tied together solid. When the train derailed the truck of the forward car grounded not only the third rail but the feeder cables, having a combined current setting in the substation of 30,000 amp. Following regular operating practice, the operator of the substation into which these cables lead tried three times to close the circuit breakers, each time throwing his machines off the line. Apparently the current rush through the third rail and feeders was so tremendous that the third rail was stretched out and kinked or buckled in varying amounts all along the line. In at least three places it was kinked and thrown over beyond the middle of the track, tearing loose or breaking the third rail insulators. The most remote of these points of maximum displacement was ¾ mile away. More than an hour after the accident, at this distant point, the third rail was still hot to the touch.

Association News

Prudence in National Affairs Urged

Reduction in Excess Profits Taxes and Income Surtaxes Necessary—Duty on Imports Should Be Made on Current Exchange Rates—Unnecessary Expenses Keep Cost of Living Up

ONE of the speakers at the midyear dinner of the American Electric Railway Association, held Feb. 10, 1921, in Chicago, was Hon. John W. Weeks, ex-Senator from Massachusetts. His address was not available prior to delivery and could not be included in the issue that contained a full account of the conference. Senator Weeks, while not speaking directly on railway matters, did touch upon several things that bore on the cost of railway operation, such as taxes and the cost of living.

REVISION OF TAX LAWS

On the necessity for a revision of the tax laws, he said that before the war about half of the government revenue, outside of post office receipts, came from the tariff and the other half from internal revenue receipts. Because these two sources were insufficient to carry on the war, the government imposed an excess profits tax, modified somewhat from European practices, but still with many irregularities that produced extravagance. When the armistice was signed it was apparent that prices would react. An excess profits tax cannot be collected, he said, when people are losing money, and for that reason as soon as the war was over this form of tax should either have been repealed or greatly modified.

As for the income tax, the surtaxes are too high, not because the person taxed has to pay too much, but because they have led to large investments in non-taxable government securities, with the result that many of the richest men in the country do not pay a single dollar in income surtaxes.

PROTECTIVE TARIFF ON IMPORTS

In 1914 and 1915, when it seemed that the country was on the verge of difficult times and business was bad, the import duty averaged less than 6 per cent. Twenty years ago it was 23 per cent. Today, with the depreciated rate of exchange, the average duty is 5.75 per cent. If the exchange rate was the same as when the law became effective, the amount of duty collected would be twice what it is. Senator Weeks suggested a provision to be made in the law permitting a change in the rate of duty when there was any material modification in the rate of exchange, and stated that the rate of duty on importation must be as reasonable as possible, not only to protect our own market but to enable the people on the other side to get on their feet. Based on the $4,000,000,000 estimate as the cost of governmental operation, import duties should pay, he said, $750,000,000, or 18.5 per cent. This would be a reality today if the duties now assessed were based on normal rates of exchange.

The inheritance tax, Senator Weeks stated, was not revenue in the ordinary sense of the word, but a symbol of property, and every dollar collected should be used to pay off the national debt and not current running expenses.

ECONOMY OF GOVERNMENT

The party that comes into power on March 4 is going to carry out its campaign pledge for economy of government, but people have no conception of how difficult it is to reduce expenditures, even though Congress is the most conservative part of our government. For the last twenty years, with but two exceptions, it has appropriated less money than asked for by bureau officers. Congress is now cutting the life out of a great many appropriations and should have real encouragement from the people at home when it tries to economize.

PRESENT CONDITION NATURAL

In conclusion Mr. Weeks stated that the condition that now exists in this country is perfectly natural. He agrees that we are inflated, that we may look healthy, but in reality are not healthy and will not be until we get back to normal conditions. However, he is optimistic enough to believe that we are tending toward those healthier conditions, but as it takes patience to bring about a state of normalcy such as should exist, every man should have courage. Let him look into his own affairs first and see if he is no worse off than at the beginning of the war. What is needed is courage and ordinary prudence in government and other affairs, and all will go well.

Heavy Traction Experts Confer

A MEETING of the Engineering Association committee on heavy traction met in New York City on Feb. 16, with Chairman Sidney Withington, New York, New Haven & Hartford Railroad, presiding. Present also were A. H. Armstrong, General Electric Company; L. S. Billau, Baltimore & Ohio Railroad (representing J. H. Davis); J. C. Davidson, Norfolk & Western Railway; C. H. Quereau, New York Central Railroad; J. R. Sloan, Pennsylvania System (representing the Association of Railway Electrical Engineers), and L. S. Wells, Long Island Railroad.

The committee first considered the definition of the term "heavy traction," and assumed that for the purposes of its investigations the term would cover roads operating trains of three cars or more or electric locomotives weighing 80 tons or more, or both. By committee assignment Mr. Armstrong and H. W. Cope, Westinghouse Electric & Manufacturing Company, are to compile a list of heavy traction roads for use in making a canvass for data and also to outline a questionnaire on electric locomotive practice that will bring out information supplementary to that contained in the reports of the 1920 and preceding conventions.

Mr. Withington, with other local members of the committee, will compile data on multiple-unit cars. The committee also considered the desirability of adding to its report a bibliography on heavy traction and a summary of what the heavy traction committees of other associations have been doing during the year. The desirability of getting together with electrification committees of other associations was also discussed and a sentiment in favor of a movement to this end was expressed. The meeting adjourned to reconvene probably early in May.

Claims Subjects Chosen

AT THE time of the midyear conference in Chicago last week a joint meeting was held by the Claims Association executive committee and its committee on subjects. Those in attendance at this meeting were: John J. Reynolds, claims attorney Boston Elevated Railway; W. F. Weh, superintendent of accident department Cleveland Railway; R. E. McDougall, general manager New York & Harlem Railroad; W. G. Fitzpatrick, general claim attorney Detroit United Railway; E. L. Lindemuth, claim agent Wilkes-Barre Railway; S. B. Hare, claim agent Altoona & Logan Valley Railway; J. S. Kubu, claim agent New York State Railways; Wallace Muir, claim agent Kentucky Traction & Terminal Company; W. H. Hyland, claim agent Fonda, Johnstown & Gloversville Railway.

The topic of greatest interest to both the industry and the public was considered to be safety. It was therefore decided to have one day of the October convention designated as "Safety Day," and on that day there should be a joint meeting with the T. & T. Association, the entire meeting being devoted to the subject of safety.

The second subject selected for consideration is "What Should Be the Method of Claim Departments in Handling Accidents and Claims." The purpose of this selection, as the title implies, is to bring forth what appears to be, or is believed to be, the most efficient mode of handling accidents and claims without regard to the size of the property or the location thereof.

The third subject chosen was "Constructive Arguments as Opposed to Destructive Contentions in Accident Investigation and Adjustment." This will be considered under the following subdivisions:

1. Refusal to give signed statement, by claimant or witness.
2. Refusal to permit medical examination.
3. Refusal of reasonable settlement without the advice of an attorney, or a threat to employ a "shyster" or a professional negligence attorney.
4. Refusal of claimant to disclose witnesses or attending doctor.
5. Request for company's witnesses.
6. Request by claimant for copy of description of occurrence.
7. Request that claim department repair damaged property.
8. Allegation that unfair advantage is taken of claimant.
9. Contention that any person injured in car accident is entitled to damages.
10. Request for adjuster to make frequent return calls.
11. Refusal to call at claim department offices for discussion.
12. That the company is liable or would not call upon claimant.
13. That settlement with driver for injury indicates liability for property damage.

This subject, it is hoped, will develop a psychological method of procedure in claims work.

The fourth subject will also be considered in a number of subdivisions. The topic is "Essential Points to Cover in Accident Investigation," and the subdivisions follow:

1. Boarding and alighting.
2. Collision with person.
3. Collision with vehicle.
4. Passenger assaulted; ejected; arrested; etc.
5. Passenger struck by passing car.
6. Passenger struck by standing vehicle or obstruction.
7. Vehicle wheel catching in switch or special track work.
8. Unreported accidents.
9. Falling in car.
10. Falling off car.
11. Riding on fender, bumper, etc.

12. Doors closed upon person or passenger.
13. (a) Car derailed.
    (b) Runaway car.
    (c) Car straddling switch.
    (d) Collision of cars.
    (e) Electrical disturbance in controller or motors.

The object of the fourth subject is, of course, the efficient training of the investigator with reference to the points that he should cover in making his investigation of a given accident. It is hoped so to treat this, educationally, as to have it furnish a practical code for guidance in such work.

As the fifth subject it was decided to have a "Free-for-All Discussion" on the following topics:

1. Value of publicity in claims work.
2. Best method of handling hospital cases.
3. Automobile hazard.
4. Using the mails to obtain witnesses' statements.
5. Claims by company for damage to its equipment and how such claims are handled.

It is proposed on this subject to have a series of oral discussions, limited to ten minutes, and this, it is believed, will afford ample scope for the exposition of mature views on the various sub-titles covered.

Employees Send Gavel to President

AN EMBLEM of authority was sent by his Charleston shop employees to President P. H. Gadsden of the American Association for use at the midyear conference at Chicago and thereafter. This gavel is their own handiwork. The following letter came with it to Chicago and explains the how and why of its construction:

CHARLESTON, S. C., Feb. 1, 1921.

P. H. GADSDEN,
President Charleston Consolidated Railway & Lighting Company,
Philadelphia, Pa.

DEAR SIR: Doubly "Our President," as the executive head of the Charleston Railway & Lighting Company and president of the American Electric Railway Association, we, your loyal employees and admirers who have known your worth for long, feel a just pride in the fact that the profession has seen fit to honor you by electing you as its head. We feel that the association in doing this has also honored itself by electing to this high position in the profession one who so richly deserves all the honors which they can bestow as a testimonial of their appreciation of your valuable services to the industry during the trying period of the great war, as well as your tireless efforts at all times to bring their true condition to the attention of the public.

In token of the high regard which we hold for you we therefore ask that you accept this "Emblem of Authority," which is the handiwork of your shop employees of the railway department. This is in no sense of the word a common gavel, as each piece of wood in its composition has, through long years of association, a meaning which we feel that you will appreciate. The dates which it bears, 1897-1921, as well as the twenty-four pieces of mahogany, cherry and maple which form its head, are emblematic of the years of service which these pieces of wood have done for you and the company as parts of the twenty-one old cars which were recently scrapped.

The mahogany parts and case are from the original interior finish of the Jackson and Sharp cars and the cherry strips are from the little Laclede single-truck cars with which the first electric railway service in Charleston was performed. The hickory strip in the handle is from a grab handle of one of the Brill single-truck cars and the maple is from the original flooring of the Jackson and Sharp cars.

We hope that this gavel may reach you in time to be used when you preside at the midwinter meeting of the American Electric Railway Association at Chicago on Feb. 10 and that you will honor us by using it. We also trust that it may be used at the great annual meeting of the association next October.

We therefore ask that you accept it as a token of esteem from

YOUR RAILWAY SHOP EMPLOYEES,
by F. H. HARRIS,
Superintendent of Equipment.

How to Keep the Hired Help on the Job

AS A PART of the publicity service now being carried on by the association it has reprinted in leaflet form the seven points laid down by Paul P. Haynes of the Indiana Public Service Commission in his recent address before the Indiana Public Utility Association, mention of which was made in the issue of this paper for Jan. 22, page 181.

These leaflets can be obtained in any quantity upon application to the secretary's office. A supply of 250 will be furnished gratis, but for quantities in excess thereof a nominal charge will be made.

Central Electric Accountants' Meeting

THE Central Electric Railway Accountants' Association met in annual convention at Dayton, Ohio, on Jan. 21 and 22. The principal subjects which came up for discussion were the cost of production of power and the distribution cost, the establishment of a freight astray bill, the adoption of a scheme for the minimum amount of collections on freight and passenger interline settlements and the use of the unit way bill as compared to the blanket way bill. A definite settlement of none of these questions was reached. The morning session on Jan. 22 was devoted to a round-table discussion of problems confronting individual properties.

Four new members were elected to the association, as follows: W. G. Bell, auditor Springfield (Ohio) Terminal Railway & Power Company; P. A. Hommel, auditor Dayton (Ohio) & Western Traction Company; Miss E. H. Smith, auditor Cleveland, Alliance & Mahoning Valley Railroad, and J. W. Anthony, freight auditor Interstate Public Service Company.

At noon on Jan. 21, as mentioned in the issue of this paper for Feb. 5, the members present were taken to the plant of the Ohmer Fare Register Company, where luncheon was served to them, after which a trip through the plant was made. The Indiana-Ohio Bowling championship was then decided, the score being slightly in favor of Indiana. Dinner was served at the Elks' Club, following which the association went to a theater party as the guests of Mr. Ohmer.

The following officers were elected for the ensuing year. President, A. R. Baxter, auditor Indianapolis & Cincinnati Traction Company, Rushville, Ind.; first vice-president, Irwin Fullerton, general auditor Detroit United Lines, Detroit, Mich.; second vice-president, F. O. Reed, auditor Western Ohio Railway, Lima, Ohio. R. H. Ewan, auditor Toledo, Fostoria & Findlay Railway, Fostoria, Ohio, and H. F. McColgin, auditor Indianapolis & Louisville Traction Railway, Indianapolis, were elected to membership on the executive committee for a two-year period.

Paving Burden Attacked Abroad

IN ENGLAND, as in the United States, according to C. J. Jewell, electrical engineer Yorkshire (England) Electric Tramways, the question of the track paving burden is a live subject. As a means of relief, he suggests that it might be possible to apportion a part of the mechanically propelled vehicle tax to the maintenance of the railway strip paving. Because the tramcar is railborne, he believes, it is impossible for it to cause wear of the road surface, and it seems unfair that the expenses for paving maintenance between the tracks and 18 in. outside should be placed on the patrons of the tramway.

New England Railwayans Meet at Boston

St. Lawrence River Power Project and Equipment Maintenance Featured in New England Street Railway Club Meetings; House Chairman Worrall Also Addressed Meeting Informally

ONE of the most successful groups of meetings in the recent history of the New England Street Railway Club was held at the American House, Boston, Feb. 3, when Henry I. Harriman, president New England Power Company, discussed the St. Lawrence River power project; House Chairman George M. Worrall of the Massachusetts legislative committee on street railways spoke informally on experiences in traction legislation, and W. D. Wright, superintendent of equipment the Rhode Island Company, led a round-table discussion on equipment maintenance. I. A. May, president of the club, occupied the chair at the evening meeting, which followed the usual dinner, and before Mr. Harriman's address five new members were elected. The annual banquet of the club is scheduled for March 22, at the Hotel Copley-Plaza, Boston, and it is hoped to have a member of President-elect Harding's cabinet address the club at that time, and the names of other prominent speakers will be announced later. Dinner will be served at $6 per cover.

Mr. Harriman reviewed the St. Lawrence project comprehensively and emphasized the great benefit it would bring to New England railroads, public utilities and industries through electrification and the distribution of low-priced hydro-electric energy. He pointed out that the scheme would yield about 26,000,000,000 kilowatt-hours per year, assuming development on both sides of the river. The estimated cost is $300,000,000 and about ten years would probably be required to complete the development. A saving of about 30,000,000 tons of coal per year would be secured in this way, releasing the labor of about 100,000 men for other work. Only 2 mills per kilowatt-hour would be required to pay all interest charges and amortize the total cost of the project in thirty-five years. The savings resulting from the use of this latent hydro-electric energy would suffice to pay 4 per cent annually on the entire capitalization of all the railroads of New England. The commercial advantages of the project include the benefits to the transportation world from the construction of a navigable way permitting through water shipments between the New England coast and Great Lake ports.

Mr. Worrall spoke informally about his observations and experiences as a member of the Legislature who has sat for about eight years on the street railway committee.

EQUIPMENT MEN SHOW SUSTAINED INTEREST IN SAFETY CARS

Beginning with a discussion of safety measures as indicated in the recent ruling of the Massachusetts Department of Public Utilities, the equipment conference, participated in by about forty men during a two-hour afternoon session, interchanged experiences and emphasized continuing interest in safety-car practice, headlight work and devices for impelling energy saving on cars.

In discussing safety cars the point was made that it is desirable that a valve easily reached by passengers be located within the car so that, in case the motorman is overcome when resuming speed after a stop, the doors can be unlocked and the brakes applied by those within the car, the power also being shut off. Evidence was introduced to show that little or no safety-car equipment has ever been abandoned after going into service. The composition of this equipment, especially in relation to automatic features, embraces the use of well-tried devices long successful in air-brake work and having an extremely high percentage of reliability.

Several speakers emphasized the excellent record safety cars of the single-truck type have made in snowy weather, as compared with the larger double-truck cars, especially where the latter are provided with but two motors. The use of snow scrapers in northern climates was shown to be vitally essential to the best service from single-truck safety cars in heavy snows. Also, the use of both trolley wheels under sleety conditions has been found helpful in some cases in keeping the cars moving, the forward wheel acting as a sleet cutter for the rear wheel. It was brought out in the discussion that it would probably be feasible for the manufacturers of motors to design a motor of say 40-hp. rating for safety-car service, in case the weights of such cars are carried above 16,000 lb. Such a motor, it was said, might weigh about 500 lb. more than the present 25-hp. equipment. An intermediate size of motor might also be developed if a market for such a motor should materialize.

A short discussion occurred on the location of car rheostats, and the advantages of placing these within the cabs of large snowplows were touched upon. The possibility of locating rheostats of compact design on car roofs in passenger service was also brought forward. Recent improvements in rheostat insulator design have given operating men much satisfaction from the standpoint of trouble reduction.

USE OF DEVICES FOR IMPELLING ECONOMICAL USE OF ENERGY ON CARS IS FAVORED

Measuring apparatus, designed to record the energy consumption of car equipment, the amount of time spent in coasting, the time power is on the car, etc., were freely discussed. It was generally agreed that great improvement in the work of motormen followed the installation of such equipment, provided care was taken to secure the co-operation of employees by clearly explaining to them the objects sought in these installations. Several members testified their appreciation of the cordial co-operation given in the introduction of these devices by representatives of employees' unions and individuals, emphasis being laid upon the appeal to the personal interest of the employee in co-operating to save power and reduce brakeshoe wear and indirectly to better his own prospects through the institution of economies in the operation of the railway system of his company.

The meeting closed with a brief discussion of the possible use of oil in place of grease for gear-case lubrication, although the wisdom of the practice was questioned.

The American Engineering Standards Committee has approved revised specifications and tests for Portland cement, as agreed upon by the appropriate committee of the American Society for Testing Materials and the government departmental committee on cement. Copies of the specifications may be obtained from the standards committee, 29 West Thirty-ninth Street, New York City, or from the A. S. T. M. at a nominal price.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION

PERSONAL MENTION

Albany Building New Force

United Traction Determined in Its Stand Against Men Who Rejected Wage Cut

Riot and blizzard have combined to defer the restoration of normal service on the strike-bound trolley lines of Albany, N. Y. Despite the efforts of the management of the United Traction Company, very few cars were operated on the lines during the first week of the strike. Aided by a number of strikebreakers the company has now succeeded in opening up most of the routes. Harry B. Weatherwax, vice-president and general manager, has announced that the railway will soon begin the recruiting of a new operating force to replace the strikers.

All attempts at settlement of the dispute between the railway and its employees have failed. The walkout was precipitated by the announcement that, beginning Jan. 28, wages would be reduced 25 per cent. This would bring the maximum wage down from 60 cents to 45 cents an hour, or to the scale in effect prior to July 1 last. This cut was made necessary by the refusal of the Public Service Commission for the Second District to grant the railway an increase in fare from 7 cents to 10 cents. The commission authorized an 8-cent fare in Albany, but refused an advance in Troy and directed a return to 5 cents in Rensselaer.

The men, who are members of the Amalgamated Association, demanded that the matter of reducing wages be submitted to arbitration. This proposition was flatly rejected by the management on the ground that payment of even the 45-cent scale would result in a considerable loss. The men thereupon walked out, tying up service in Albany, Troy, Rensselaer and other cities.

The Public Service Commission on Feb. 2 directed the company to resume operation not later than Tuesday, Feb. 8. In an attempt to comply with the order the company manned several cars with strikebreakers. The appearance of the cars provoked the wrath of the strikers and their sympathizers. Switches were blocked with dirt and snow. The cars were stoned. Numbers of guy wires were cut.

Governor Orders Police Service

When the first repair wagon left the carhouse it was followed by a large crowd of men and women, and was guarded by six mounted policemen.

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MOUNTED MEN OF TROOP K, N. Y. STATE POLICE, GUARDING LINEMEN REPAIRING WIRES ON UNITED TRACTION LINES

To reinforce the ranks of the city police Governor Nathan L. Miller ordered more than 100 state police to Albany. The state troopers soon succeeded in restoring order. Under the protection thus afforded the company set about to repair the damage to its equipment. For several days "dummy" cars were run on a few lines.

The situation was complicated on the night of Feb. 10 by a six-inch fall of snow. The force of strikebreakers was unable to cope with conditions. The work of clearing the tracks was a matter of days. Meanwhile all vehicular traffic was tied up. The jitneys which had been operating since the "electrics" stopped were snowbound.

Seattle Payroll Met

Private Bank Comes to Aid of Municipal Railway Employees Paid in Future Warrants

The problem of meeting the payroll of the trainmen on the Seattle Municipal Railway lines has been solved temporarily at least by the offer of the Marine National Bank, Seattle, to cash pay warrants of the employees for salaries. The offer, made in view of the "critical situation which would arise in event employees were not able to cash the pay warrants," as the bank explained, will avert the crisis which has developed since Feb. 1, when the city treasurer began setting aside all receipts of the railways to meet $404,000 due in interest on outstanding bonds, chiefly on the $15,000,000 in bonds paid by the city in the purchase of the Stone & Webster lines.

The bank, in making its offer, stated that while problems not contemplated when the city purchased the lines had developed recently it considered the matter as a civic duty, adding that the offer was made "with the hope that upon payment of the employees in cash full attention and time can be given to constructive measures and the ultimate solution of the perplexing problems of the railway system itself." The bank states that cashing of warrants will continue after Feb. 10 "until further notice."

City Treasurer E. L. Terry sets forth that the income of the railways is approximately $17,500 a day and will be available for warrants after Feb. 24, the first twenty-four days' receipts being required for interest charges. The treasurer estimates that eight pay days—four months—need to be met in the manner arranged, each semimonthly payroll carrying about $135,000. Besides, each month there will be bills of about $150,000 for materials and supplies. The city treasurer states that the fund should be on a cash basis again about June 15.

The payroll crisis is only one of the problems of the railway. The city must now turn its attention to raising $713,000 for interest and principal on the railway bonds by June 15. While the city treasurer stated the system would be back on a cash basis by June 15, Mayor Caldwell states that he evidently did not contemplate setting aside $140,000 a month to meet the September interest charges and the principal retirement to begin March 1, 1921. This item of interest and principal, along with $83,000 owed by the railway to the general fund, would amount to $713,000 by the time the system is on a cash basis again.

New York Transit Bill Introduced

Governor Miller's Program Calls for Revamped System, Release of City's $250,000,000 Investment and Protection for Investor

Governor Miller of New York on Feb. 14 made public a summary of the rapid transit bills to be submitted to the Legislature containing his recommendations for securing statutory relief for the railways in New York City. One of the measures is an amendment to the Public Service Commission law and provides for two commissions. One is to be a Statewide commission with power over all utilities, excepting transit, in New York. The second commission will handle exclusively the metropolitan transit problem. The first commission will have five members; the city commission three, with five year terms.

THE State's police power to modify rates, either by way of increase or decrease, is provided "upon terms, conditions, safeguards or readjustments of franchise or contract rights or obligations."

Sufficient return from operation of the new unified transit system to exempt from the debt limit the city's investment in transit lines is the only specific provision made in the bill on the subject of rates. The whole question is one of adjustment. It is left with the commission to decide.

Home rule is guaranteed to the metropolis in a measure. If, however, the Board of Estimate of New York City is unable or unwilling to co-operate, or unable to decide its own policy, then the commission may conclude an agreement without the approval of the board.

The ideas behind the bills were, perhaps, set forth best by the Governor in a letter to Oliver B. Bridgman, New York, who said that he found quite a few people who had been hesitant about the Governor's program because they had no information with regard to the work the commission would be expected to undertake when it was appointed by the Governor should the Legislature comply with the Governor's recommendation. The plan as outlined to Mr. Bridgman follows:

1. The value of the physical property used in the public service, without reference to present capitalization, should be determined. The data for such valuation of many of the lines must already be in the possession of the present commission. It should not take long to make a valuation of the others.
2. Eliminate all outstanding inter-company leases.
3. Retire outstanding securities except such underlying liens as cannot readily be retired, for which provision looking to eventual payment must be made.
4. Vest in the city title to all lines not already owned by the city, free and clear of all incumbrances, except such underlying liens.
5. Make a lease to a new company, which shall provide for amortization of the determined valuation and for adequate reserves for depreciation, contingencies and the like.
6. Mortgage such lease to an amount approved by the commission, and issue stock and bonds not in excess of the valuations determined by the commission, in exchange for the securities retired.
7. To promote prompt reorganization and revamping of lines without assessing security holders, defer interest and dividends for one or two years, as might be determined by the commission, and at the end of such period prescribe a rate of fare sufficient to pay all charges provided for in the lease.
8. As an incentive to efficient management provision could be made for increased return on capital as fares are decreased, and a reduced return as they are increased.
9. Looking to the eventual transfer of general regulatory powers to the single Statewide Public Service Commission, provision could be made for a hoard of control, on which the city and the company should have proper representation. The alternative to that would be representation by the city on the Board of Directors of the company. The board of control plan is probably preferable, and that board might well have the powers of the present Transit Construction Commission.
10. As all approved charges will adequately be provided for under the plan, the provisions of the dual contracts for preferential payments could be eliminated and such other changes made as will fit these contracts into the plan, and as may appear to be in the public interest.
11. Provision for the imperative and immediate needs of the city for further transit facilities should be made promptly.
12. Determine what further relief, if any, can be given by legislation.

This outline was suggested merely for the purpose of discussion. The Governor said that a readjustment of the present deplorable situation in New York by any plan that may ultimately be decided upon should have these results:

1. To the public, a revamped and rehabilitated transit system that can and will give adequate service; assurance that the exploiting of the public for stock-jobbing and other purposes is really an evil of the past, and a new set-up that will insure efficient operation of the system at a fair return for service really and fully performed. This would mean an end of the present intolerable conditions which endanger the comfort, the health and even the life of the traveling public.
2. To the city, the ownership of the greatest transit system in the world; the freeing of its present frozen investment in the subways, so that approximately $250,000,000, including the amount for which the city is already obligated, will be released for new subways and extensions, schools and other badly needed municipal improvements, and adequate participation in, and control of, the new system.
3. To the investor. the full protection of the real values in the present transit systems, and the protection and stabilization of the new securities so as to render them an attractive field for investment.

The transit bill embodying the ideas of Governor Miller was introduced in the Senate on Feb. 16 by Senator John Knight, Wyoming, chairman of the public service committee of that body and in the Lower House by Simon Adler, majority leader. No extra copies of the legislation were available on its introduction. This provoked considerable discussion. It was decided that hearings on the bill in New York City would serve no useful purpose. A public hearing will, however, be held at Albany on March 2 before the public service committee of the Senate and judiciary committee of the Assembly.

Power Project a Five-Year Undertaking

Application for water-power development on the Colorado River in Mojave County, Ariz., which, producing 480,000 hp., will make possible the electrification of 500 miles of the Atchison, Topeka & Santa Fé Railway, and irrigation of approximately 500,000 acres of land, has been filed with the Federal Power Commission by E. L. Beyard of Seligman, Ariz. This project is backed by Kansas City and Philadelphia financiers in a corporation capitalized at $6,000,000. In this project it is proposed to construct eight dams, the first of which will be located about 25 miles due north of Needles, Cal., and the last of which will be built inside Grand Canyon National Park.

Dorchester Program Outlined

Alternative Plans Suggested Costing from $20,635,000 to $7,100,000 for their Completion

A comprehensive report, dealing with estimates of investment required and probable operating costs of various plans for increased rapid transit facilities in the Dorchester district of Boston, has been presented to the Massachusetts Legislature by a joint board consisting of the Massachusetts Department of Public Utilities and the Transit Department of Boston.

The several plans discussed are of particular interest in that they involve comparisons of costs by extension of an existing tunnel with costs of operating rapid transit trains on new tracks built on existing steam railroad rights-of-way, and also costs of high-speed surface cars on reserved spaces in public highways. The report also brings out the fact that the Washington Street and Park Street Station facilities of the Cambridge-Dorchester tunnel are already congested, and are not capable of meeting the demands which the proposed extensions of this rapid transit line would impose.

The report shows that to accomplish the generally desired result of relieving the Dorchester traffic situation, the following plans are under consideration, with estimated costs as shown:

Extension of Tunnel, Investment about	$20,635,000
Daily operating deficit	$ 4,649
Use of Midland Division, N. Y. N. H. & H. R.R., Investment about	$10,300,000
Daily operating deficit	$ 2,178
Use of Shawmut Branch, N. Y. N. H. & H. R.R., Investment about	$ 7,100,000
Daily operating deficit	$ 1,200
Complete circuit, using two sections, Investment about	$15,900,000
Daily operating deficit	$ 2,567
Complete circuit, using Shawmut Branch above and surface cars in reserved spaces in streets for balance of circuit, Investment about	$15,900,000
Daily operating deficit	$ 2,233

The investment estimates, and daily operating deficits were computed on present-day costs and traffic densities. The Joint Board gave as its opinion that the wisest course would be to consider the development of only some one part of any of these several plans for the present, and stated that even that would still be subject to acceptance by the trustees operating the Boston Elevated Railway. The latter are now said to be studying the report of the joint board, which meanwhile has recommended to the Legislature the necessity for authorizing a continuance of its study of this subject.

Budgets and Economy Urged

Governors Deal with Electric Railway Problems—Blue-Sky Legislation Also Recommended

Electric railway problems received special attention this year from the Governors of New York, Connecticut and Illinois in their messages to the Legislatures. As a matter of fact the Governor of New York has made the traction problem the subject of a special message. In Connecticut, as noted previously, the Governor addressed the Legislature at length on this matter and transmitted a special report by a committee appointed to consider the entire subject. In Illinois Governor Small urges the creation of a transportation district in furtherance of the recommendations contained in the report made to Mayor Thompson by his special commission.

The messages of the Governors elsewhere indicate a realization on the part of all of them of the need for economy. In fact, practically all the Chief Executives urge closer adherence to the budget system. Another subject to which many of the Governors called attention is the need for stringent laws governing the sale of securities to the public. Workmen's compensation being pretty generally in effect, recommendations on this matter were confined very largely to the strengthening and the modification of the laws already in existence. Other matters that receive attention are water power development and the conflict in authority between state and government over intrastate rates.

Gov. Henry J. Allen, Kansas, said that the Court of Industrial Relations was meant to be a court of human relations, not a court of public utilities. Because of the desire to save the cost of an additional body the Industrial Court was authorized to administer the old public utilities law. He said, however, that if the court was to work out the big, real purpose of its existence, it would need to be relieved of the burden of public utility regulation. He has since sent a special message to the Legislature on this subject.

URGES ABOLITION OF UTILITIES COMMISSION

Gov. Leslie Small, Illinois, urges the General Assembly to repeal the state public utilities law and thereby abolish the State Public Utilities Commission. He further urges the passage of a law giving to all cities in Illinois the right of home rule in the regulation and control of their public utilities. He feels, however, that there should be some state body or agency exercising governmental authority over such properties with powers and jurisdiction similar to the Railroad & Warehouse Commission, which was supplanted by the present Public Utilities Commission. He wants the General Assembly to give this subject immediate attention. He also urges the Assembly to enact legislation to permit the citizens of Chicago and vicinity, if they so elect, to establish an independent transportation district and "to provide for people's ownership and operation of local transportation systems" under the plan advocated in the recent report on transportation to Mayor Thompson of Chicago.

Twenty-six Persons Injured on Long Island Railroad

Twenty-six persons were injured in an accident on the Long Island Railroad at 9:40 p.m. on Feb. 13 at Crescent Street, Brooklyn, on the Atlantic Avenue division. It is at this point that the four-track line from Jamaica is reduced to two tracks which continue into the Brooklyn terminal. Up to the afternoon of Feb. 14 the investigation of the accident by the company had not yet been completed.

The testimony of witnesses of the accident, however, indicates that the accident was caused by Motorman Edward Costello, in charge of local Train No. 3653, running past a signal and through the main track switch, which was set against him.

Motorman Thomas Moore, of Train No. 2755—a westbound express from Hempstead—was running on the middle or express track, and had a clear block. He applied the emergency brakes as soon as he realized that the local was occupying the main track, but was too late to stop his train. The express "side-wiped" the local train, partly turning over the first two cars of the local, and derailing one of the cars of the express. The tracks and interlocking device at the Chestnut Street tower were badly damaged.

Motorman Costello, who was arrested, charged with responsibility for the accident, was an experienced man. He entered the service of the Long Island Railroad on May 25, 1906, as a fireman, and was promoted to engineman on May 6, 1912.

Normal train operation in and out of Brooklyn was resumed at about 10 a.m. on Feb. 14.

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DAMAGE SHOWN AS DONE BY EXPRESS RAMMING LOCAL

Counter Plan by City

Municipality Would Seek Authority to Purchase Certain "Day-to-Day" Lines of Detroit United

An ordinance proposed by the Board of Street Railway Commissioners for presentation at the April election provides for the purchase of approximately 25 miles of lines operated by the Detroit United Railway under the so called day-to-day agreements. The measure has been read twice by title in the Council, ordered printed and laid on the table for future action.

The proposal of the Detroit United Railway, which will also be on the April ballot, is the initiative ordinance providing for unified operation of all lines by the Detroit Service-at-Cost Railway under regulation by the city. The Detroit United Railway would receive 6 per cent on the value of its property.

The Street Railway Commission sets forth in a resolution that it has caused to be constructed approximately 18 miles of single track of the Municipal Street Railway system authorized by the electors of the city of Detroit on April 5, 1920, and is now operating cars on part of these lines and desires to add to the operating unit certain other trackage and property authorized to be acquired under the proposition of April 5, upon which certain streets the Detroit United Railway has constructed lines under the terms of day-to-day resolutions passed by the Common Council.

The Commission is advised by the Corporation Counsel that the contracts of purchase need to be approved by the electors of the city before all or any part of the street railway property in question can be purchased.

The question to appear on the ballots is: Shall the city of Detroit and the Board of Street Railway Commissioners be authorized and empowered to purchase at cost thereof less depreciation, all or any part of the street railway property of the Detroit United Railway construction upon the streets, alleys and public places of the city of Detroit, under the terms and conditions set forth in certain day-to-day resolutions or contracts between the city of Detroit and said company.

Payment for these lines is to be made out of the proceeds of the public utility bonds authorized to be issued at the April 5 election. Under the existing agreements in case the city and the Detroit United Railway fail to agree on the price to be paid for the lines, a board of arbitrators will be selected consisting of three members to determine the price to be paid.

Injunction Again Invoked at Detroit

Another restraining order was secured by the Detroit (Mich.) United Railway against the city of Detroit when Judge Denison of the United States Court of Appeals at Cincinnati granted the company's petition for an injunction to prevent the city from interfering with the company's tracks on Harper Avenue between Gratiot Avenue and Montclair. A hearing has been ordered for Feb. 19. Judge Denison was appealed to in the absence of Federal Judge Tuttle from Detroit and the State.

The action is the company's answer to the City Council's action in passing a resolution instructing the street railway commission to notify the company to remove its tracks from Harper Avenue.

In the recent resolution of the Council it is claimed that the Detroit United Railway has partly constructed a concrete base with ties and tracks along Harper Avenue and along the route in question but has never completed it for the operation of cars. The present condition of this construction is held by the commission to be a menace to the public in addition to preventing the city from extending its tracks along Harper to Gratiot Avenue.

The city claims that under the terms of the resolution of May 27, 1919, it was expressly provided that in event of the revocation of the resolution, the company would forthwith remove from the streets, the property to be permitted to be placed therein.

The Council, in the resolution just passed which resulted in the issuing of the restraining order, directed the Commissioner of Public Works or the Street Railway Commission or such other municipal authority as might be necessary to remove the property, in default of the company complying with the city's demand.

Under the terms of the day-to-day agreement now in force between the company and the city, the city claims the right to buy from the Detroit United Railway at any time at the cost of the lines less depreciation. The company maintains that the city's action constitutes an impairment of contract and disputes the city's right to purchase in this case.

Indiana Commission Attacked

Lively Hearing Before General Assembly on Bill to Abolish Commission —Many Commission Defenders

The bill before the General Assembly of Indiana to repeal the law creating the Public Utilities Commission has been reported out of committee and now is on its third reading. In Indiana the law provides that bills shall not be printed until they have been reported out of the committee and passed by a second reading. The forces favoring the bill used the argument that the legislature members who were fighting the bill should at least wait until it had been printed and distributed in order that it might be more thoroughly digested by the individual members who before had no direct connection with the progress of the bill.

REPORT ON COMMISSION'S SERVICES NEEDED

The minority members of the Assembly are hailing with delight the first real division that has stirred the very heavy Republican plurality in both House and Senate. Those opposed to the repeal of the present utilities law declare they have a majority in the House of about seventeen votes, all of which will be cast against the present bill.

A hearing held in the House on Jan. 27 crowded the chamber to overflowing. Those favoring the retention of the present law were overwhelmingly in the majority. Members of the Public Service Commission were present at the hearing, but none of them vouchsafed any information except when incorrect statements were made concerning the work of the commission. B. R. Inman, manager of the Chamber of Commerce of Indiana, called attention to the fact that the alleged expenses of the commission were being used by those opposed to the commission as propaganda to prevent the people from knowing the facts. He said that a statement of facts relative to the service rendered by the commission was more to be desired in connection with the hearing than any opinion that he might express as to the merits or demerits of the proposed bill.

Claude A. Smith, one of the authors of the bill, attacked the commission in a short talk. He pointed to several utility companies which had gone through the duration of the war without a rise in rates.

LARGE ATTENDANCE PRESENT

Among those who spoke before the committee advocating the retention of the commission were Charles L. Henry, president of the Indianapolis & Cincinnati Traction Company; Mayor Charles Jewett, of Indianapolis; Henry A. Barnhart, president of the Indiana Telephone Association; Dick Miller, president of the City Trust Company; E. Vernon Knight, president of the New Albany Veneering Company; Joseph Kebler, vice-president of the Indianapolis Board of Trade, and Joseph E. Bell, former Mayor of Indianapolis. Many men prominent in the gas industry were present, but they did not take the floor.

Wisconsin Railroad Commission Attacked

For the first time since the Wisconsin Railroad Commission was created, its members have been summoned before the State Legislature to explain a decision. The immediate cause of this action was the granting by the commission of a 20 per cent increase in gas rates to the Milwaukee Gas Light Company.

Under the Wisconsin law the Legislature may interpellate the commission, provided a sufficient number of the members sign the petition and not more than a certain proportion of them are members of one political party. The commission has been asked to produce all records in the case and to explain the basis of its orders and the extent of the investigation made into the financial status of the company.

A petition has also been filed with the Legislature by the Federated Trades Council of Milwaukee asking for the abolition of the commission. A bill to that effect has actually been introduced in the Assembly. It seeks the repeal of all the commission laws and provides for the regulation of public utilities by local authorities.

The commission will be interpolated on Feb. 24. Meanwhile it has ordered a public hearing in Milwaukee on Feb. 18 on the question of reopening its decision in the gas rate case.

Anti-Traction Bills Introduced in Illinois

The bill which would create a transportation district and pave the way for people's ownership and 5-cent fares in Chicago was introduced in the upper house of the Illinois General Assembly on Feb. 8. The following day bills were introduced to repeal the public utilities act and to grant home rule in the regulation and control of public utilities.

The indications are that these bills will be vigorously pushed with the idea of having them passed by the Legislature in time to place them before the people for referendum at the April 5 election. Unless affirmative action is secured by Feb. 23, however, the matter cannot be included in the April election.

The bill which would create a transportation district is identical with that formulated by Mayor Thompson's traction commission and approved by the Chicago City Council.

A counter municipal ownership proposition was also introduced in the Lower House by Representative Church, and by Senator Evans in the Upper House. This bill would provide for municipal ownership by raising the municipal tax limitations from 5 per cent to 15 per cent where the excess is to be used exclusively for the purchase of utility properties.

Still the Road Was Permitted to Die!

Residents of Providence and Danielson, R. I., mourn the loss of the Providence & Danielson Railway, authorized recently to be scrapped. The thing these people feared has come upon them. Despite all that the road did for them, these people have suffered the line to decay and die. The funeral oration as delivered by the Danielson *Transcript* showed ingratitude, the marble-hearted fiend, at its worst. That paper said:

> The road is dead. Its life has been a beneficent one. It served a previously isolated country. It turned a worthless wilderness into greenbacks. It doubled and trebled real estate values. It brought the farmer nearer to the city markets, and gave the merchant a quick freight. It gave an impetus to village growth and improvement. The city and country folks came and went and knew each other better. There was greater homogeneity.
>
> Educational privileges were enchanced and multiplied. The city newspaper came out daily where before it was unknown. Scores of bright Rhode Island boys and girls came up to our Killingly High School, or further down the line attended the city schools.
>
> Churches were benefited. Religious gatherings and conventions were better attended. There was a more frequent interchange and intermingling of the pastors and congregations of different churches. Country churches were often served by city pastors. Thus was fraternal feeling and better acquaintance made possible.
>
> Healthful and pleasant recreation and enjoyment were promoted. Picnics, Old Home Days, fairs, etc., multiplied along the line, and an ever helpful and courteous management catered to the pleasure of its patrons.
>
> The road was always popular with summer tourists, who were seeking a day's outing and were delighted by the transition from the lowlands, the smoke and the smells of the city to the fresh breezes of the western highlands. During its brief life of less than twenty years it transported more than 20,000,000 people.
>
> With unfeigned sorrow and many regrets we see our old friend handed over to the merciless undertaker of the junk heap. The hand of local progress has moved backward along the dial even beyond the time of the stage coach days of genial John Richards and William Stone. Providence is again a distant city.

Service-at-Cost Legislation for Milwaukee

The Common Council of Milwaukee, Wis., in special session on Feb. 1, 1921, adopted a resolution authorizing the City Attorney to co-operate with the committee on acquisition of public utilities in formulating legislation, which if passed would enable the city to negotiate with the Milwaukee Electric Railway & Light Company for the operation of Milwaukee's railway system on a "service-at-cost" basis.

The resolution was previously unanimously endorsed by the Council's joint committee on finance and legislation. The action was asked of the Council by the committee on acquisition of public utilities, an official body, which for about a year has been investigating the question of municipal ownership of public utilities in Milwaukee, particularly of the electric railway system.

F. S. Hunt, chairman of the committee, is reported to have said recently:

> If the valuation of the property can be decided on, the committee, I believe I can say, would report in favor of a "cost of service" plan for the operation of the railway lines. This would be similar to the plan now in effect in Cleveland with one addition.

Removal of New Jersey Commissioners Sustained

The Court of Errors and Appeals of New Jersey on Feb. 15 by a vote of seven to six sustained the action of Governor Edwards in removing from office the four members of the Public Utilities Commission for alleged misconduct and neglect of duty. This confirms the decision of the Supreme Court, which also upheld the "ouster" in quo warranto proceedings brought by the Attorney General to test the right of the ousted members of the board to continue in office.

The decision of Feb. 15 removes all question as to the legal status of the commissioners removed from office by the Governor last September. The Board, however, continued to function until the Supreme Court decision affirming the "ouster" was rendered on Dec. 27.

Chief Justice Gummere in his opinion on Feb. 15 said the court was justified in assuming that the Governor had found all the members guilty of some of the charges of neglect or misconduct and that that afforded justification for his action.

Immediately upon receipt of word that the Court of Errors and Appeals had upheld Governor Edwards in ousting the commissioners serving under the old law the Republican leaders rushed through the Legislature the Walworth bill for a new Public Utilities Commission.

News Notes

Decision Against One-Man Cars.—The City Commission of Port Huron, Mich., has refused permission to the City Electric Railway to operate the one-man type of car in the city of Port Huron.

Brooklyn Shops on Short Shift.—Lindley M. Garrison, receiver for the Brooklyn (N. Y.) Rapid Transit Company, announced on Feb. 11 that the general repair shops of the company will be shut down one week this month and one week next month and that the inspection shops will be operated five days a week instead of six, as heretofore. The reason, the receiver said, is that work, which had piled up in the shops since the strike, has become normal again, and this means is taken to avoid the alternative of laying off a considerable number of employees. The order will affect about 1,500 persons. Since the first of the year, Mr. Garrison added, 300 employees have been laid off, largely in the surface repair shops, because of decrease in the amount of work, due to the discontinuance of a number of the surface lines.

Programs of Meetings

American Association of Engineers

A national engineering conference on public information will be held in the Congress Hotel, Chicago, on Feb. 25 under the auspices of the American Association of Engineers. Among those who will address the sessions are Richard H. Waldo, general manager of the Inter-Racial Council, and State Chief Engineer Mack of Wisconsin. F. W. Feiker, vice-president of the McGraw-Hill Publishing Company, and Ivy L. Lee, director of publicity for the Interborough Rapid Transit Company, will present papers. R. W. Crumm of the Iowa Engineering Society will tell of the publicity work which his society has done in Iowa. The purpose of the conference is to discuss the question of engineering publicity from every possible angle and reach decisions upon the effectiveness of various publicity methods. Among the round table discussions will be such subjects as "Technical News Service," "A National Clipping Service," "How Publicity Helps a Community" and "Engineering Publicity from Standpoint of the Public."

Wisconsin Electrical Association

The thirteenth annual convention of the Wisconsin Electrical Association will be held at the Hotel Pfister, Milwaukee, Wis., March 23 and 24. A joint session with the Wisconsin Gas Association will be held on the afternoon of March 23, at which time an address on safety will be given by Charles B. Scott, manager the Safety Bureau, Chicago, an address on "Public Utility Associations," by R. V. Prather, secretary, Illinois Electric Railway Association and of the Great Lakes Geographical Division N. E. L. A., and a third address on the work of the Wisconsin Public Utilities Bureau by Frantz Herwig, director.

On March 24 the following papers will be heard:

"Induction Regulators," by Frank Hershey, General Electric Company; "Electrical Merchandising," by C. E. Michel, sales manager, Union Electric Light & Power Company, St. Louis, Mo.; and a "Symposium on One-Man Car Operation," by B. W. Arnold, Eastern Wisconsin Electric Company; H. A. Mullett, the Milwaukee Electric Railway & Light Company; R. M. Howard, Wisconsin Railway, Light & Power Company; Dudley Montgomery, Madison Railways Company, and C. R. Phenicie, Wisconsin Public Service Company.

Other papers will deal with the subjects of "Street Railway Rate Schedules," by W. H. Sawyer, president East St. Louis & Suburban Railway; "Power Factor—Methods of Correction, Measurement and Application to Rates," by F. A. Coffin, sales manager the Milwaukee Electric Railway & Light Company; and "Customer's Demand as a Factor in Rate-Making," by L. B. Andrus, American Public Utilities Company.

Financial and Corporate

$1,073,020 Deficit in Seattle

Preliminary Accounting for Municipal Railway Shows Serious Situation —Revenues Now Increasing

According to a summary issued by City Comptroller H. W. Carroll the Seattle (Wash.) Municipal Railway shows a deficit of $1,073,020 for the year 1920, $677,178 of this sum being charges for depreciation. The statement showing passengers carried notes a decline in traffic beginning in February, 1920, and continuing throughout the year.

While cash fares slumped when the first fare increase was adopted there was a marked increase in the number of "deadhead" rides, the year's total showing an increase of 363,297 rides by policemen, firemen, mail carriers and railway employees, or about one-third more than in 1919. The railway is reimbursed for all this riding, except that done by railway employees.

At the same time there was a decrease of 9,114,648 in the number of cash rides during the year, as compared with 1919. While $61,777 is charged to loss on property retired from service a footnote explains that other losses from property retirements, amounting to approximately $165,000, are being accounted for, but that exact figures are not yet available.

The total revenue for the year was $5,463,393, of which $5,410,764 was from fares. The total expenditures were $6,536,413, including $865,660 in interest on bonds and warrants.

At the end of December, 1920, the cash deficit of the railway system was $95,318, and there were warrants outstanding of $19,205. This showing is against a cash balance on hand of $208,064 on Jan. 1, 1920. The comptroller's office, in issuing the figures for the year, estimated that the system would be back on a cash basis by May 1.

It is announced that since Jan. 9, when the 8½-cent fare went into effect, the revenues have mounted to an average of $18,550 a day. This includes tokens purchased but not used, the actual fares received and earned being about $17,500 a day. The increase in revenue is said to be about $2,800 a day.

Increase of $228,310 in Texas Electric Net Earnings

Stockholders of the Texas Electric Railway held their annual meeting at Dallas, Texas, recently. The officers were re-elected.

In his report J. F. Strickland, president of the company, gave the gross earnings from operation for the year as $3,454,615, an increase of $503,104, or 17 per cent over the previous year. Operating expenses and taxes totaled $2,013,072, an increase over 1919 of $274,794, or 15.8 per cent. Net earnings from operation were $1,441,543, an increase of $228,310, or 18.8 per cent over those of the previous year.

The report cited that regular dividends have been paid at the rate of 7 per cent on the first and second preferred stocks and other regular dividends on the common stock. The sum of $210,000 has been set aside from the surplus into the renewal and replacement reserve, to be used for purposes of maintenance and upbuilding the company's property, it was stated. The surplus of the company has increased $356,914 during the year.

The report pointed out that the company is "being called upon constantly to make additional investments in the various communities which we serve," on account of paving work programs along the various lines. In this connection it says:

> We would again point out that if these local railway systems are to be a successful, growing part of the rapidly growing communities which are served by them, some sort of relief such as increased fares, reduction of taxes or abolition of paving charges, or possibly all of these, must be worked out.

United Railways, St. Louis, Appraised at $48,936,805

The Missouri Public Service Commission has placed a value as of Jan. 1, 1919, of $48,220,316 on the properties of the United Railways, St. Louis, including the Florissant Construction, Real Estate and Investment Company and the St. Louis County Street Railway and $716,497 on the Missouri Electric Railroad. This total value of $48,936,805 covers both carrier and non-carrier property. Conforming to the practice of the Missouri Commission the items of promotion and going value have been omitted, not that they have no place in a valuation but for the reason that it is the practice of the commission to make due allowance for these items at the time of fixing the fair present value of the property.

The par value of securities outstanding on Dec. 31, 1920, including $4,200,000 of receivers certificates, amounted to $95,581,000. The total market value of these securities at that time was $30,136,221.

Bankers Study New Orleans Problem

A number of bankers of New York and Philadelphia conferred on Feb. 14 with Receiver O'Keefe, of the New Orleans Railway & Light Company, at New Orleans relative to straightening out the affairs of the railway. Among those who took part in the conference were M. M. Buckner, president of the New York Trust Company; G. M. Dahl, vice-president of the Chase National Bank, New York; Joseph Wayne, president of the Girard National Bank, Philadelphia; George M. Reilly, Reilly, Brock & Company, Philadelphia; Clarence Harper, Harper, Turner & Company, Philadelphia; J. A. Caldwell, Philadelphia.

A survey of the company's lines was planned by the bankers for Feb. 15 with the view of determining what is needed to put the lines in good working condition. It was expected that following the inspection a formal statement would be given out to the press.

New Charter Proposed

British Columbia Electric Railway Seeks to Place Company Under Railway Commission of Canada

The British Columbia Electric Railway, Vancouver, B. C., has applied for a Federal charter under the name of Vancouver, Fraser Valley & Southern Railway, the name of one of its existing interurban lines. The intention is to have the Vancouver, Fraser Valley & Southern Railway, under its new charter, take over the whole of the company's properties consisting of city and interurban lines in Vancouver, North Vancouver, New Westminster and Victoria, and its light and power systems with the exception of its power plants. The company's gas properties would not be included under the new charter. It is proposed also to change the name of the Vancouver, Fraser Valley & Southern Railway back to the British Columbia Electric Railway or a similar name.

The object of this move is to place the company under the jurisdiction of the Board of Railway Commissioners of Canada, a Federal body, and by that means obtain the stability as regards fares and rates which will enable the company to raise new capital. At the present time the company is temporarily under that commission, having been taken under Federal control in 1919 by an Act of Parliament not intended to operate on electric railways.

The Parliament of Canada, at its last session passed an amending Act returning the British Columbia Electric Railway to provincial jurisdiction about July 1, 1921. Owing to the abolition of the Provincial Public Utilities Commission, this would thrust the company back on its original franchises which call for a 5-cent fare although a 6-cent city fare and a 7-cent suburban fare are the rates now charged.

The alternatives before the company are the negotiating of new franchise rates with half a dozen cities and municipalities, or obtaining authority from a separate commission. The latter course has taken the form of an application for Dominion Charter in the absence of a Provincial Commission. The company is pointing out that new capital will be urgently required during the next year or two and that it will be impossible to obtain it if its fares are not on a stable basis.

Holding Company and Leases Scrapped

Rhode Island Properties Simplify Financial Structure and Secure State Aid—Jitneys Eliminated

Direct ownership by a new company of the electric railway properties at Providence, R. I., is provided in place of the former involved system of holding companies and leases under the plan for the reorganization of the railways there as approved by the joint reorganization committee. This committee consists of Michael F. Dooley, Stephen O. Metcalf and Samuel P. Colt. The existing securities to be readjusted by the plan consist of $13,998,000 of bonds and $8,000,000 of stock. The new securities provided by the plan will consist of $12,598,200 of bonds and $7,999,800 of stock, making a reduction in the capitalization of $1,400,000.

A FEATURE of the plan is that the board of directors of the United Electric Railways, the successor company, shall consist of nine members, five elected by the stockholders, one appointed by the trustee under the general and refunding mortgage, two appointed by the Governor by and with the advice and consent of the Senate and one appointed by the Mayor of Providence.

TABLE SHOWING ALLOCATION OF BONDS AND STOCK OF NEW COMPANY AT PROVIDENCE

New Company Bonds and Stock		For $4,708,000 Rhode Island Suburban Railway First Mortgage 4% Bonds	For $247,000 Pawtuxet Valley Electric Street Railway First Mortgage 5% Bonds	For $43,000 Cumberland Street Railway First Mortgage 6% Bonds	For $9,000,000 United Traction & Electric Company First Mortgage 5% Bonds	For $8,000,000 United Traction & Electric Company Capital Stock	For Cash	Totals
Prior Lien Mortgage.....	Series A 7%	....	....	....	....	....	$1,000,000	$1,000,000
Twenty-five Year Gold Bonds........	Series B 4%	$1,883,200	$98,800	$17,200	....	....	....	1,999,200
General and Refunding......	Series A 5%	....	....	....	$8,100,000	....	....	*8,100,000
Mortgage Thirty Year Gold Bonds.......	Series B 4%	2,354,000	123,500	21,500	....	....	....	2,499,000
Capital stock............		470,800	24,700	4,300	900,000	$6,600,000	....	†7,999,800
Totals.................		$4,708,000	$247,000	$43,000	$9,000,000	$6,600,000	$1,000,000	

* An additional amount not to exceed $500,000 general and refunding bonds Series A are reserved for issue to provide for the acquisition of such of the Rhode Island Company Properties as the joint reorganisation committee may determine to acquire.

† Additional capital stock may be issued in the discretion of the joint reorganization committee for the purposes of the plan to the amount permitted by the Rhode Island Public Utilities Commission.

The charter of the new company limits to $22,000,000 the par value of the stocks, bonds or other evidences of indebtedness which may be issued in payment for the lines and properties which it is proposed to take over. A comparison of present capitalization of the United Traction System and the proposed new capitalization follows:

(a) Amount of existing Securities to be readjusted by the plan:		
Bonds..........	$13,998,000	
Stocks..........	8,000,000	$21,998,000
(b) New securities provided by the plan in lieu of existing securities:		
Bonds:		
Prior lien Series B 4s............	$1,999,200	
General refunding mortgage Series A 5s..............	8,100,000	
General refunding mortgage Series B 4s............	2,499,000	
Total.........	$12,598,200	
Stock............	7,000,800	20,598,000
(c) Reduction.....................		$1 400,000

In addition to these securities there will also be an issue of $1,000,000 of prior lien, Series A, 7 per cent bonds, which will be sold for cash.

The plan and agreement of reorganization contemplate the acquisition and operation of the railway lines and properties included in the reorganized system by the United Electric Railways. The charter of this company was granted by the Rhode Island General Assembly at its 1919 session and amended at the 1920 session. Under it the United Electric Railways is authorized to acquire the lines and property of the Union Railroad, Providence Cable Tramway, Pawtucket Street Railway and Rhode Island Suburban Railway (formerly leased to the Rhode Island Company and controlled by the United Traction & Electric Company), the lines and property owned by the Rhode Island Company, and the lines and properties formerly leased to the Rhode Island Company by the Sea View Railroad and the Providence & Danielson Railway. The consent of the Attorney-General of the State of Rhode Island is required if less than the whole of the foregoing properties are acquired.

As stated previously, the charter limits to $22,000,000 the par value of the stocks, bonds or other evidences of indebtedness of the new company which may be issued in payment for the lines and properties mentioned, and limits to 6 per cent the dividends which may be paid upon the capital stock of the new company, except that a deficiency in any year may be made good in a subsequent year or years.

The General Assembly at its 1920 session passed acts exempting the new company from all taxes except taxes imposed by cities or towns upon its land, buildings or other tangible property, freeing it from certain paving and street improvement obligations imposed upon electric railways by the Rhode Island laws, and making all town and city ordinances affecting it subject to review by the Public Utilities Commission.

The city of Providence has also recently passed an ordinance regulating jitneys and motor-buses. This it is believed will prevent in large measure the unfair competition to which the railways have heretofore been subject.

The allocation of bonds and stocks of the new company is shown in the accompanying table.

In the opinion of the several committees representing the security holders, the plan presents the following advantages:

1. It provides at least $1,000,000 cash for rehabilitation, of which there is present need.
2. It reduces the fixed charges upon the United Traction System to $654,928. The amount which the Rhode Island Company was required by its leases to pay upon the same properties as fixed charges was $1,050,000.
3. It reduces the aggregate capitalization to an amount which, although much less than the estimated cost of reproduction of the property, should be representative of just expectations of income return under ordinary future conditions.
4. It obtains the benefit of the yearly exemption from taxation and limitation of paving and other obligations which will result, it is estimated, in an annual saving of more than $500,000.
5. It substitutes the direct ownership by the new company of the entire properties for the former involved system of holding companies and leases—a result which will undoubtedly be beneficial from the point of view of organization and will remove a source of public misunderstanding.
6. It secures the control of the Public Utilities Commission over the issue of securities by the new company, the limitation in the charter upon the capitalization and dividends of the new company, and the representation of the State and the city of Providence upon its board of directors;—all of which will, it is believed, be conducive to the interests of the security holders as well as of the public.

City Joins Rental Appeal Case

The City of Philadelphia, Pa., and the Public Service Commission have filed petitions in the State Supreme Court asking for an allowance of an appeal to that tribunal from a decision of the Superior Court which relieved the underlying companies of the Philadelphia Rapid Transit Company from the necessity of obeying a commission order directing them to answer complaints about rentals paid.

The decision of the Superior Court was referred to in the ELECTRIC RAILWAY JOURNAL for Dec. 25, page 1303.

Following the decision of the Superior Court the United Business Men's Association filed a petition for an appeal in the Supreme Court. In this proceeding the city and the Public Service Commission have now joined. The Supreme Court will hear the case in Philadelphia on April 18.

Brooklyn Receiver Asks Instructions

Petition of 120 Pages to Court Contains Statement of Earnings and Summary of Debt

Facts about the conduct of the Brooklyn (N. Y.) Rapid Transit Company under the administration of Lindley M. Garrison as receiver are contained in a 120-page petition by Mr. Garrison to the court, making a report as to the affairs of the company and seeking instructions of the court. In general the petition says that it seems too clear to require elaborate statement that the transportation problem in Brooklyn should be treated as a whole and that it is impossible satisfactorily to deal with it piecemeal.

THE petition points out that while under existing conditions there is no centralized authority capable of dealing with the situation as an entirety, and while it is not suggested that the court, under existing conditions, can deal as adequately with the question presented to it as it could if there were such a centralized authority capable of dealing with the situation as a whole, it is nevertheless important in the opinion of the receiver to consider the necessities of the situation as a whole with a view to meeting it as fully as existing law permits.

COMPARATIVE INCOME ACCOUNT OF BROOKLYN RAPID TRANSIT CO.

	From Jan. 1, 1919, to Nov. 30, 1920	Five Months to Nov. 30, 1920	Month of November, 1920
Total revenue	$30,380,838	$6,505,821	$1,339,383
Total operating expenses	26,867,980	5,238,490	1,082,127
Revenue over operating expenses	$3,512,858	$1,267,331	$257,256
Total taxes	469,156	104,784	20,961
Revenue over expenses and taxes	$3,043,700	$1,162,546	$236,294
Total income deductions	*1,999,170	*641,716	*128,341
Surplus	$1,044,530	$520,830	$107,952

*Does not include interest on any bonded indebtedness.

Limitations of space prevent more than an indication of the general contents of the report. Separate figures of operation are presented for the various companies included in the system from Jan. 1, 1919, to Nov. 30, 1920, for the five months to Nov. 30, 1920, and for November, 1920, together with detailed statements of the obligations of the various companies, interest in default, taxes and other claims unpaid, facts about changes in fares such as the changing of an extra 5 cents on certain lines, results with one-man cars, etc.

The comparative income statement of the Brooklyn Rapid Transit Company for the periods previously referred to, as condensed by the ELECTRIC RAILWAY JOURNAL, is shown in the accompanying table.

The separate statement of the Nassau Electric Railroad for the five months to Nov. 30, 1920, includes strike expenses of $342,246 in the item total street railway operating of $2,390,699. The similar statement of the Brooklyn, Queens County & Suburban Railroad includes strike expenses of $101,621. The statement of the Coney Island & Brooklyn Railroad includes $127,981 for strike expenses. Similar figures for the New York Consolidated Railroad are $1,271,543, making the total direct strike loss $1,847,393. Indirect losses are estimated at $720,000 additional. These are exclusive of the Brooklyn City Railroad, returned to its owners.

The detailed statement as to the bonded indebtedness (including bank loans secured by bonds) of the Brooklyn Rapid Transit Company and the interest in default thereon shows that there is an outstanding indebtedness against the property company of $73,255,000, excluding indebtedness to constituent companies aggregating $6,427,437 (and interest due thereon of $648,579). All of this indebtedness is in default and, as of Dec. 31, 1920, there is interest in default on the said indebtedness of $11,652,358. Foreclosure proceedings have been brought by the trustees of all of the several mortgages of the Brooklyn Rapid Transit Company.

In addition to the foregoing bonded indebtedness, there is also the indebtedness created by the receiver's certificates, of which at the present time $5,000,000 in principal amount are the sole indebtedness of the receiver.

The statement of bonded indebtedness and notes and bills payable of the Brooklyn Rapid Transit Company is shown in the accompanying table.

INDEBTEDNESS OF BROOKLYN RAPID TRANSIT COMPANY

Nature of Debt	Issued	Owned	Pledged	Net Outstanding	Annual Interest
First mortgage 5 per cent bonds	$7,000,000	$5,000	$25,000	$6,970,000	$348,500
First refunding mortgage 4 per cent bonds	27,621,000	5,092,000	17,329,000	5,200,000	208,000
Consolidated mortgage 6 per cent bonds	29,000,000	291,327	28,708,672	....	....
Total bonded indebtedness	$63,621,000	$5,388,327	$46,062,672	$12,170,000	$556,500
Three-year 7 per cent gold notes	$57,230,000	....	....	$57,230,000	$4,006,100
Six-year 5 per cent gold notes	505,000	....	....	505,000	30,300
Bills payable, banks and trust companies	3,350,000	....	....	3,350,000	201,000
Total notes and bills payable	$61,085,000	....	....	$61,085,000	$4,237,400
Grand total	$124,706,000	$5,388,327	$46,062,672	$73,255,000	$4,793,800
Exclusive of bills payable to constituent companies					6,427,437
Interest thereon to Dec. 31, 1920					648,579

There are also claims against the company for debts arising prior to the receivership under contract (exclusive of bank loans, notes, bonds and intercompany claims) by 522 creditors for an aggregate amount of $775,181, upon which there is an admitted liability of $749,382, and liability for the balance of $25,798 is in question. No claims have been filed against the company for tort damage.

The application shows that the Nassau Electric Railroad receiver has suspended in whole or in part the operation of the following lines:

Ocean Avenue (in part).
Rogers Avenue.
Church Avenue.
Seventh Avenue.
Park Avenue.
39th Street-Coney Island (in part).
Hicks Street.

The Brooklyn, Queens County & Suburban Railroad receiver has suspended in whole or in part operation of the

Metropolitan Avenue line (in part).
Wyckoff Avenue line.
Ralph Avenue shuttle line.

The Coney Island & Brooklyn Railroad receiver (in conjunction with the Nassau receiver and the Brooklyn City Railroad) has ceased operating the experimental Park Slope Line.

The application shows that the following additional lines are failing at the present time to earn even their direct operating expenses:

Wilson Avenue line.
Ralph-Rockaway line.
Eighth Avenue line.
Vanderbilt Avenue line.
West End Avenue line.
Eighty-sixth Street line.
Ocean Avenue line.
Broadway line.
Jamaica Avenue line.
Reid Avenue line.
Broadway-Ferry shuttle.
Metropolitan Avenue line.
Utica Avenue line.
Franklin Avenue line.
Smith Street line.

The application shows that having, under the order of the Public Service Commission and the Supreme Court, purchased seventy-three safety cars and having paid on account thereof in cash the amount of $170,703, the Nassau receiver, for lack of funds, has had to default on his car lease warrants issued for the remaining installments of purchase price which amount to $299,647, and that he is in danger of having the cars taken away from him, losing both the cars and the money.

The application shows that there has been a 35 per cent increase in wages since the appointment of the receiver; adding approximately $4,700,000 to the cost of operation during receivership.

In addition to wage increases the cost of operating during receivership was increased by the advance in the price of coal from $3 per ton to $9 per ton and substantial advances in other prices.

The application points out that the property of each individual company in receivership and the income therefrom must be separately administered for the benefit of each company's particular creditors so that neither the funds nor the property of any one receivership can be used for the benefit of any other receivership.

The petition of Mr. Garrison to the court was heard by Judge Mayer on Feb. 14. At that time two new phases of the railway situation were disclosed. One was the suggestion that the 5-cent fare should be confined to surface lines operating within the borders of the old city of Brooklyn and the other that Mr. Garrison had prepared papers in an action against the city for approximately $20,000,000 for losses incurred because of the city's delay in completing the dual system, a part of which the Brooklyn Rapid Transit Company is to operate under Contract 4. The discussion lasted for more than three hours.

The suggestion that the area of the old city of Brooklyn before consolidation should constitute one 5-cent fare zone and all of the numerous towns that make up the present Brooklyn Borough another 5-cent fare zone each came in a flurry of argument of how to keep in operation fifteen surface lines that could not support themselves.

Financial News Notes

Refunding Issue Offered.—Tucker, Anthony & Company, New York, N. Y., are offering at 96¼ and interest to yield about 7.30 per cent $914,000 of 7 per cent first refunding mortgage sinking fund gold bonds of the Manchester Traction, Light & Power Company, Manchester, N. H. The bonds are dated Aug. 1, 1917, and are due Aug. 1, 1952. The purpose of the issue is to refund a like amount of consolidated mortgage 5 per cent bonds due April 1, 1921. After April 1, 1921, the refunding mortgage sinking fund gold bonds now being offered will be a first lien on the property.

Road Saved from Scrap Pile. — The Carlisle & Mt. Holly Railroad, Carlisle, Pa., has purchased from McGovern & Company, New York, the 7-mile electric railway between Carlisle, Pa., and Mt. Holly, Pa. This road was formerly operated by the Cumberland Railway, which sold all its track and rolling stock to the McGovern Company. Mention of this sale was made in the ELECTRIC RAILWAY JOURNAL for Dec. 18, 1920. The line between Carisle and Newville, Pa., will be torn up and sold for scrap in the spring. Thomas MacDonald is president of the new company. H. M. DeLone is secretary and treasurer.

Additional Defendants in Restitution Suit. — The suit brought by Ella Van Deusen against the Maumee Valley Railways & Light Company, which resulted in the company being placed in the hands of Raleigh D. Mills, as receiver, was enlivened when Thomas H. Tracy, one of the defendants named in the original suit, asked in a cross petition that seventeen additional defendants be brought into the suit. The suit is a test to determine whether the original stockholders can be made liable for $900,000 of debts including matured bonds and for money due under the double liability clause in stock subscriptions.

E. A. McNutt a Barcelona Director.—Following the regular annual meeting of the stockholders of the Barcelona Traction, Light & Power Company at Toronto, Ont., a special general meeting ratified a new by-law of the directors removing the compulsory feature which had been provided for the redemption of a certain amount of preferred stock each year. The change was made coupled with the provision that the company may redeem preferred shares at 110 at any time it sees fit. E. A. McNutt, of the Sun Life Insurance Company, Toronto, replaces T. B. Macauley, president of the Sun Life, as a director of the utility at the latter's request.

Senate Modifies Valuation Measure.—Court review of the valuation to be fixed by the engineering firm engaged by the New Jersey Valuation Commission is provided for under the Senate Mackay bill adopted by the New Jersey Senate. Senator Parry, of Essex County, fought the bill, urging his measure, which would not make mandatory the valuations fixed by the appraisers. Mr. Parry argued that the engineers' report on the value of the Trenton & Mercer County Traction Corporation and the Public Service Railway should only be considered by the Public Utility Commission as an element in arriving at a basis of fares. The Mackay measure would make the valuation mandatory.

Extension of Time for Readjustment.—The depositors of the first mortgage 5 per cent sinking fund thirty-year bonds of the Albany Southern Railroad, Hudson, N. Y., who had entrusted their securities with the Bankers Trust Company, New York, have been notified that the time in which the plan for the financial readjustment of the company may be declared operative has been extended to June, 1921. This extension applies also to the privilege of depositing bonds under the plan. It is also announced that the first refunding bonds to be issued under the amended plan will bear interest from March 1, 1921. Payment of the coupon due on that date on the bonds on deposit with the Bankers Trust Company will be made by the company to registered holders of certificates of deposits.

Treasurer Unaware of Sale Negotiations.—The Watertown (N. Y.) *Standard* said, in a recent issue, that according to a rumor in circulation in that city the Northern New York Utilities, Inc., was negotiating for the purchase of the property of the Black River Traction Company. It was said that the utilities would purchase the railroad and extend it to Carthage through Black River, Felts Mills, Great Bend, Deferiet and Herrings, thus linking up this chain of small industrial villages between Watertown and Carthage and paving the way for the development of the section. Richard Krementz of Krementz & Company, Newark, N. J., treasurer of the Black River Traction Company, asked by the ELECTRIC RAILWAY JOURNAL to confirm the report contained in the *Standard*, said it was all new to him.

Operating Organization Provided by Court.—Approval of a contract entered into between Henry C. Paul, receiver for the Fort Wayne, Van Wert & Lima Traction Company and the Indiana Service Corporation, whereby the latter is to supply officials for the maintenance and operation of the Fort Wayne, Van Wert & Lima Company for the next six months, or as long as the receiver deems necessary, was made by Judge A. B. Anderson, in Federal court at Indianapolis recently. Mr. Paul, in his petition to the court, alleged that the Fort Wayne, Van Wert & Lima Traction Company is now and has for some time been operated by the Ohio Electric Railway under a lease, and had not left any officials in charge and in order to continue the operation of the road it would be necessary for these officials to be selected. He says the Indiana Service Corporation has offered the interurban the service of its general manager, engineer of maintenance, superintendent of transportation and engineer of distribution.

Duluth Company Reports to City.—Herbert Warren, vice-president and general manager of the Duluth (Minn.) Street Railway, has filed with the city auditor the report of the company for the year ended recently. The total revenue derived from transportation last year was $1,477,912. By far the largest portion of this, $1,476,145, was derived from fares paid, and the balance came from mails, chartering cars and other sources. The total revenue from other railway operations is listed at $8,140. This makes the total operating revenue $1,486,053. Added to this is non-operating revenue of $19,924. The total revenue of the company for 1920 is shown as $1,505,977. The total operating expense of the company, including taxes, interest of funded debt and miscellaneous debits, was $1,419,466. The reports shows that $86,511 is available for sinking funds, additions to property and distribution. The sums of $60,000 for dividends and $18,946 for expenses was transferred to the Duluth-Superior Traction Company, which controls the local lines in Duluth. The capital liabilities of the company are $3,942,643, included in which are $1,200,000 of stock and $2,516,590 of bonds.

Traffic and Transportation

Fares Before Referee

Railway at Fort Worth Wants to Retain Seven-Cent Rate—Asks Ten per Cent Return

The Northern Texas Traction Company, Fort Worth, Tex., is combatting the city's order to reduce fares from 7 cents to 6 cents. The city charter of Fort Worth and the franchise granted the Northern Texas Traction Company, permit the company to raise fares without authority from the city government, but the city has the right to investigate and determine the reasonableness of the fare. This the city is now doing.

The city issued an order directing the company to reduce its fares to 6 cents. Upon the refusal of the company to comply with this demand the city, after negotiations with the company, appointed N. A. Dodge, Fort Worth, as referee to conduct an investigation and hear testimony from both sides and to determine the reasonableness of the 7-cent fare. He has been conducting hearings bearing on the valuation of the company's property, the earnings, operating costs and other factors that enter into the question of reasonableness of the fare charged.

TEN PER CENT RETURN SOUGHT

In its opening statement the company's attorneys admitted the right of the city to regulate fares and to see that they permit only a reasonable amount of return. This right, however, counsel maintained, is limited by the Constitution of the United States which guarantees protection against confiscation through the imposition of an unreasonable rate, and that the right of protection extends not only to the title of the property itself, but also to a fair and equitable rate of return on the invested capital.

The "fair rate of return" asked by the traction company's counsel in this instance was 10 per cent, and it was declared that "any rate fixed by the public authorities so low as to yield insufficient revenue to pay operating costs and leave for the owner a fair return on the value of the property devoted to the public service, is not only unfair and unreasonable, but is also confiscatory."

The attorneys declared that they would show that anything less than a 7-cent fare would not yield a fair return and would in effect be confiscatory.

H. P. Gillette, expert for the company, taking the 1915 appraisement as a basis and adding to it the cost of additions since made, declared the historical value of the property to be $6,182,468. Its reproduction value as of Jan. 1, 1921, taking the Interstate Commerce Commission table of items as a basis, he placed at $11,575,513.

Counsel for the city took issue with Mr. Gillette as to the reproduction theory of fixing valuation for rate-making purposes, and Mr. Powell declared that such theory did not afford a fair rate-making basis.

George H. Clifford, vice-president and general manager of the company, declared that at no time in the history of the company had it earned a fair return. Starting with 1917 he declared there had been a big increase in the company's expenses, due to the rise in wages and the cost of materials, yet despite this no increase in fares had been made until May, 1920.

REFERRED TO REFEREE

When the hearing was concluded, Mr. Dodge, the referee, took the matter under consideration.

Dime Fare in Worcester

An order dated Feb. 4, has been issued by the Massachusetts Department of Public Utilities authorizing an increase in fares on the Worcester Consolidated Street Railway. The increase affects both the city of Worcester and outlying lines. The order also abolishes certain transfer charges heretofore collected. The new rates took effect on Feb. 6.

The order provides for a 10-cent flat fare in the city, abolishing the former two-zone system in which 7-cent fares were charged in each zone. Free transfers are established throughout the new flat-fare area which includes the whole area formerly divided into two zones. The order also establishes 7-cent fares on all suburban lines where the fare was formerly 6 cents. Transfer charges are abolished on lines operated from Beacon Park and from North Village through the center of the town of Webster to Perryville.

Proposals were made by Mayor Sullivan of Worcester to reduce fares in the city zones to 5 cents for the first zone and 3 cents for the second zone, on the ground that increased riding would result in greater revenue to the company at no addditional expense. This proposition was subjected to analysis by the commission, which concluded that even though additional riders could be carried without additional cost, it would require an increase of 37 per cent in the actual number of passengers carried to even equal the revenue received during the past year. In that year 38,045,575 revenue passengers were carried in one zone and 6,713,926 in the second zone. It was established that the Worcester Consolidated Street Railway would require a minimum of $199,274 additional revenue to meet its expenses during the present year, without any allowance for depreciation or profit to the road.

Five Cents Suggested

Bridgeport Committee Wants This Basic Fare — Desires Railway's Obligations Be Reduced

The special transportation committee appointed some time ago by Mayor Clifford B. Wilson of Bridgeport, Conn., presented a comprehensive report to the Common Council on Feb. 7. The recommendations made will be referred to the legislative committee of the Council for presentation to the Legislature. The committee recommends a return to the 5-cent fare by the Connecticut Company as the best solution of Bridgeport's trolley tangle.

In submitting its report the committee explains the failure of the 10-cent fare either to increase the company's revenue or to restore the good will of the car patron. It believes that under a zone plan with a basic 5-cent fare and "harmonized" zone transfers the problem could be settled profitably for the company in increased revenue and for the public in better service. The committee approves of a 6-cent cash fare or a ticket plan whereby twenty tickets are sold for $1. The ticket system is urged both as a matter of safeguarding the company's revenue and as a measure of safety and expedition in the operation of one-man cars.

RESULTS OF INTENSIVE STUDY

The committee has studied carefully the subject of bus competition, taxation, etc. It concluded that:

1. The 5-cent fare should be restored between city center and city limits, with a compulsory ticket system under which 20 tickets could be purchased for $1.
2. The recommendations of the Public Utilities Commission should stand in regard to division of the Connecticut Company into complete operating and accounting units.
3. The State should be divided into five regions grouped about the large cities in which electric railway business centers; these regions center about Hartford, Waterbury, Norwich, New Haven and Bridgeport.
4. A deputy should be appointed by the Public Utilities Commission to supervise all railway and bus traffic within each region and be amenable to the authority of the Public Utilities Commission only. This supervisor should make reports twice a year to the Public Utilities Commission.
5. The recent suggestions of the Public Utilities Commission should be put into effect regarding removal of street paving and highway bridge obligations from the railways.
6. The recent recommendations of the Public Utilities Commission should be put into effect in regard to taxing railways on net earnings and making the same demands upon bus companies as on railways in regard to taxation, financial reports, etc.
7. The street railways should be permitted to operate buses.
8. The Public Utilities Commission should grant bus lines franchises for interurban routes and that the city should grant franchises for city bus lines only after public hearings, with the right of appeal to Public Utilities Commission within thirty days if permit is rejected.
9. Public motor bus lines must furnish protection for passengers through liability assurances carried by the operators.

The committee explains that it is not intended to imply that the 5-cent unit fare should cover the same zones as were in effect originally. It suggests rather that the zones be arranged to conform to the value of the fare paid and to centers of traffic like the city center and to important industrial locations. It suggests working out these zones under the plan of supervision which the committee itself recommends.

Bus Injunction Held Unwarranted

Application of Public Service Railway of New Jersey for Relief Called Groundless in Report of Vice-Chancellor

No ground exists for the granting of an injunction to restrain the operation of jitneys competing with the Public Service Railway of New Jersey, according to an opinion filed in the State Court of Chancery by Vice-Chancellor Griffin on Feb. 10. The Vice-Chancellor held that under the cases bearing on the subject matter of the controversy the Public Service Railway has no cause to enjoin competing carriers from using the public streets. He accordingly advised that a decree be handed down dismissing the railway's petition. The railway on June 3 last instituted legal proceedings to halt ruinous jitney competition with its lines. Thirty-six bus operators and a number of municipalities, including the city of Newark, were named in the action as defendants. The railway contended that the buses were operating in violation of the Kates act regulating vehicular traffic and that their operation should be discontinued in the interest of both the railway and the community.

IN THE suit the complainant made no point of the use made by jitneys of its tracks, but based its right to relief on the sole ground that the defendants are illegally operating jitneys in the streets of Newark and other communities, to complainant's "great loss and damage," and that "this illegality gives it a right to an injunction."

TWO QUESTIONS INVOLVED

The proposition thus presented the Vice-Chancellor divides into two questions:

1. Has the defendant a lawful right to carry on the business of a common carrier of passengers for hire in the public streets?
2. If the defendant is without such right may the complainant maintain its bill to restrain on the ground that the competition is unlawful and complainant is suffering an irreparable injury therefrom?

Complainant, he says, contends for the negative on the ground that the defendant has not the consent required under the Kates act, and that the consent granted by Newark is null and void because it was not granted in the manner provided by the Kates act and also by the limited franchise act.

Merritt Lane, counsel for the defendant, contended that the consents from the municipalities are valid, even though not granted in the manner directed by the limited franchise act. He argued further that even if the consents were not lawfully granted the complainant had no standing to object.

In the view he takes of the case, the Vice-Chancellor says, it was not necessary to determine the validity of the consents, because the case could be decided upon the second proposition.

KATES ACT IN PUBLIC INTEREST

Of the Kates act the Vice-Chancellor says it is quite clear that it was passed "for the protection of the public, and for revenue. And it nowhere appears that it was enacted in any manner for the benefit of street railways." "This," the Vice-Chancellor says, "leads to the question whether, if the consent be invalid, the complainant may for its own advantage assert this invalidity." The opinion follows in part:

> The right of the people to use the public highways of the State freely and without hindrance, subject only to proper police regulations, unless the Legislature should otherwise ordain, is unquestioned, and in the exercise of this right the people are not exercising a franchise.
>
> Thus persons complying with the Kates act do not acquire a franchise to use the public highways. The act is prohibitive in that it takes away rights formerly possessed; and permissive and regulative in that it authorizes the use upon complying with the terms of the act. The plain purpose of the act was primarily not to license, but to regulate and control the operations of these vehicles in the crowded streets of cities for the public benefit and safety, and for revenue. It was not passed for the benefit of street railways.

HIGHWAYS PUBLIC PROPERTY

> The franchise of the complainant is as to its tracks and ways, and gives it the exclusive use thereof as against competing carriers, in the manner indicated in Camden Horse Railroad against Citizens Coach Company. It has no grant outside of the tracks and ways, and, therefore, when it seeks to enjoin competing carriers from using a highway in a manner declared lawful . . . I feel bound, following Elizabethtown Gas Light Company vs. Green, . . . to hold that it has no standing in this court to ask for injunctive relief.
>
> This conclusion is reached regardless of whether the defendant is operating his auto buses without having the consent required under the Kates act, and is guilty of a misdemeanor.

One-Man Cars in Boston

The first double-truck one-man cars ever operated in the city of Boston made their appearance on Sunday, Feb. 6, when the Eastern Massachusetts Street Railway inaugurated this service on the Woodlawn-Chelsea-Scollay Square line. The normal weekday service consists of four of these cars on twenty-minute headway, while rush-hour schedules call for eight cars.

Another novel feature of this service, so far as Boston is concerned, is the adoption of the pay-leave system on outbound trips of these one-man cars. As the in-town terminus is at Scollay Square, in the old subway, where the prepayment system has not been adopted by the Eastern Massachusetts Street Railway, and as other heavy loading points are also found outside the subway, it was decided to try the pay-leave system, and reports thus far received indicate that it is entirely successful.

The double-truck one-man cars in use are former two-man cars converted in the company's own shops. Although these are the first to go into service on lines in Boston the Eastern Massachusetts Street Railway has been converting double-truck cars for a considerable period, and already has about 300 in operation on various parts of its system. It has already operated about 2,000,000 car-miles with this type of converted double-truck one-man car. These cars are equipped with a special device, approved by the Massachusetts Department of Public Utilities, to enable the operator or any passenger in an emergency to open the rear doors by pulling on a cord, similar to the ordinary bell cord, running the entire length of the car.

Nine Cents in Cincinnati

New Rate Goes Into Effect March 1—City Street Railway Commissioner Planning Protest

Fare on the lines of the Cincinnati (Ohio) Traction Company will be raised another half a cent, to 9 cents, effective March 1. Walter A. Draper, vice-president of the company, following several conferences with officials and lawyers of the company made this announcement, saying it was the intention of the company to increase the fare because of an existing deficit.

The deficit for the months of December and January, the traction company announced, is approximately $100,000. The accumulated deficit of the company to date is about $650,000.

Under the franchise the 9-cent fare will be in operation from March 1 to May 30. Should the receipts for March and April show a deficit the company has the right under the franchise to advertise a further increase of half a cent on May 15, making the fare 9½ cents effective on June 1. A fare of 10 cents would be reached on Sept. 1, providing the reports showed a deficit for the months of June and July.

SUIT NOW PENDING

City Street Railway Director W. C. Culkins, following a conference with the city solicitor and Mr. Draper, said:

> I have placed before City Solicitor Saul Zielonka certain information which, I believe, shows that the increase in fare to 9 cents announced by the traction company is not warranted.

Mr. Zielonka stated after studying all the information Mr. Culkins supplied him that he will determine whether he would be warranted in bringing a suit to enjoin the fare increase.

A suit now pending in the courts would, if decided in the city's favor, obviate the necessity of a fare increase. This action was brought at the request of Mr. Culkins, who demands an accounting from the Cincinnati Traction Company, the Ohio Traction Company and the Cincinnati Car Company, of transactions among them in which it is charged the latter two companies benefited at the expense of the first named to the extent of $350,000.

Mr. Culkins questions the deficit of the traction company saying:

> I am not prepared to admit that any deficit exists if proper adjustments are made by the company.

Louisville Goes to Seven Cents

In a signed statement issued in announcement form on Feb. 16 the Louisville (Ky.) Railway, over the signature of President James P. Barnes, announces that starting at 4 a.m., Feb. 21, fares will be increased from 5 to 7 cents.

This announcement followed advice of Federal Judge Evans in an opinion in the case of the Louisville Railway vs. the Mayor and City Attorney, to prevent interference with an increase in fares, the company having asked for an injunction in the Federal Court.

Judge Evans held that a restraining order could not be issued until the need becomes actual instead of abstract, and advised the plaintiff to put the increase into effect immediately so that action may be taken. The original bill for relief included the Common Council in its citation, but was amended to take in the City of Louisville, the Mayor and the City Attorney.

One-Man Cars on All Lines

One-man cars were recently placed in operation on the Hillyard line of the Washington Water Power Company, Spokane, Wash. This change marks the passing of the two-man car on the Washington Water Power System. Seventeen of the big cars formerly used have been converted to the one-man type. The near-side stops have replaced the far-side stops. The company was one of the first electric railways in the country to adopt the one-man car for general use. The first cars were converted about five years ago. Since that time the company has steadily pushed the conversion until last year all its cars except those on the Hillyard line were in charge of one man each. The Hillyard cars are the largest of the system and are believed by company officials to be among the largest one-man cars operated anywhere in the country. It has been the experience of the management that the larger cars are more economical in operation than the smaller ones.

Ten-Cent Fare Asked in Denver

E. Stenger, receiver for the Denver (Col.) Tramway, on Feb. 11 petitioned the United States District Court, District of Colorado, for an advance in fares from 6 to 10 cents for adults and from 3 to 5 cents for children. Arguments on the petition will be heard by Judge Robert E. Lewis on Feb. 16.

The petition sets out that the company is laboring under a burden of high costs of operation, struggling with inadequate and worn out equipment in an attempt to render satisfactory service to the public, with the possibility of confiscation of the property unless fares are advanced and that the company is carrying a tremendous load of debt which is constantly expanding.

While agreeing that the city under its police powers has the right to regulate the rate of fare the receiver contends that it must not force the company to charge a fare that is confiscatory. Permission is asked of the court to give up the franchise obtained in 1906 for a period of twenty years, declaring it to be worse than useless to the company. Franchises granted the company in 1885 and 1886 without time limit, accord the company practically the same privileges as the 1906 franchise.

Transportation News Notes

Fare Election Declared Illegal.—The election held in Shreveport, La., last May authorizing the Shreveport Traction Company to increase its fare from 5 cents to 6 cents to remain in effect until Dec. 31, 1923, has been declared illegal by Judge J. R. Land of the Circuit Court at Shreveport. The 6c. fare had been in effect for several months.

Interurban Wants More.—John E. Zimmerman of the firm of Day & Zimmerman, Philadelphia, Pa., recently appeared at a public hearing in Alexandria, Va., to explain the need for increased rates on lines of the Washington-Virginia Railway. The company has applied to the Interstate Commerce Commission for permission to increase its rates. The railway wishes to retire its 25-trip ticket book and to increase the price of a fifty-two-trip book between Washington and Alexandria from $4.46 to $5.58. Other proportionate increases have been asked.

Court Ends More Transfers.—Federal Judge Hough recently signed an order restraining officials of the city and state of New York from seeking to prevent the Fifty-ninth Street Crosstown Railway from discontinuing the exchange of transfers with the Sixth, Seventh, First, Second and Lexington Avenue lines. The company is part of the Third Avenue Railway system. The court stated that to compel the company to continue the transfer system would violate the law, because it would be confiscatory, and stated that the company received only 2 cents from each transfer passenger and that it cost 3.96 cents per passenger, to say nothing of more than half a cent additional needed to meet interest on borrowed money.

Would Retain 7-Cent Fare.—Officials of the Indiana Service Corporation, Fort Wayne, Ind., recently appeared before the State Public Service Commission at a hearing on the company's application for authority to continue to charge a 7-cent fare on the Fort Wayne city lines. The 7-cent fare took effect on Sept. 15 last. The rate was formerly 5 cents. Figures were submitted to the commission showing that during the months of October, November and December, with the 7-cent fare in effect, a total of 3,914,895 passengers were carried on the Fort Wayne city cars. This was a decrease of 6,331 from the number carried in the same period of 1919. Passenger revenue during the three months totaled $248,810, which was an increase of $52,805 over the corresponding three months of 1919. An increase of 58,985 car-miles was shown. Operating expenses amounted to $211,296, an increase of $62,738. Data were also submitted showing that the average return on the investment for the last three months of 1920 was 6.75 per cent. During January, 1921, the number of passengers carried was 146,917 less than during January, 1920, while passenger revenue dropped $9,996.

Ten Cents in McAlester.—The Oklahoma Corporation Commission granted permission to the Pittsburgh County Railway, McAlester, operating city and interurban lines, to increase its rates, effective Feb. 15. The rate for the McAlester city lines and for territory west of the city to the state penitentiary is fixed at 10 cents single fare or three rides for 25 cents. A 5-cent fare is granted for students traveling to and from public or Sunday schools. Twelve tickets will be sold for $1 good between any two points on the interurban lines where the regular cash fare was 10 cents. A complete new set of rates is also made for interurban traffic and for express and baggage shipments. The commission found, in making its order, that present owners had never made sufficient profits to pay operating expenses and taxes, provide for depreciation and earn a reasonable return upon the capital invested. It also found that the cost of coal and electric current used for power had increased more than $25,000 per annum.

Railway Defendant in Suit.—Alleging breach of contract and claiming that the 7-cent fare has worked irreparable injury to the development of its land the Ortega Company recently filed an injunction in the Federal Court for the Southern District of Florida to restrain the Jacksonville Traction Company from maintaining a 7-cent fare. The Ortega Company, which built the line, states that when it sold the franchise to the Jacksonville Traction Company, it was on the condition that a 5-cent fare would be the maximum fare charged. The company, being engaged in the development of land in the section served by the traction company, and since it was for the purpose of furthering the sale of these lands that the 5-cent fare was contracted for in the agreement, claims that the railway has broken its contract even though the Railroad Commission authorized the increase in fares. Receiver Triay as defendant has filed a motion for dismissal of the proceedings alleging that under the Supreme Court's decision instructing the Railroad Commission to assume jurisdiction, no binding contract can be made with a municipality or individual by a railroad or common carrier. It is also contended in the receiver's motion for dismissal that private contracts and obligations must yield to the welfare of the public.

Personal Mention

Operating Skill Recognized

G. B. Anderson Appointed Manager of Transportation Los Angeles Railway —F. H. Van Vranken Promoted

For the second time within one year promotions have come to George B. Anderson and F. H. Van Vranken of the Los Angeles (Cal.) Railway. Under the new plan of organization recently announced by G. J. Kuhrts, general manager, Mr. Anderson, who has served as manager of service, is made manager of transportation, while Mr. Van Vranken, general superintendent of the railway since May 1 of last year, becomes assistant to the general manager.

The position of manager of transportation supersedes that of general superintendent and gives Mr. Anderson direction of the entire operating department. Mr. Anderson joined the Los Angeles Railway forces three years ago as director of public relations. Since that time he has advanced rapidly. He has the unique record of having been more than fifty years old when he entered the electric railway industry and of having had no previous experience in any phase of the transportation business. He established the merit system, under which trainmen receive credits and demerits according to their grade of service rendered. These marks are the basis upon which a yearly bonus is paid.

G. B. ANDERSON

Mr. Van Vranken, who becomes assistant to the general manager, was born in Schenectady, N. Y., in 1865. At the age of nineteen years he became a brakeman with the Southern Pacific. He served that road successively as brakeman, freight conductor, yardmaster and passenger conductor. In 1902 he was appointed division superintendent of the Pacific Electric Railway, continuing in that capacity until 1911, when he resigned to join the Los Angeles Railway as assistant superintendent. Two years later his title was changed to assistant to the general superintendent. He continued to serve in that capacity until his promotion to general superintendent last May.

Several other changes in the operating personnel have been announced by General Manager Kuhrts. R. B. Hill continues as superintendent of operations. Mr. Hill has held this position since Oct. 1, 1919. R. R. Smith is made assistant superintendent of operations. Mr. Smith entered the employ of the railway in 1904 as a motorman. Three years later he was transferred to the instruction department, and was appointed chief instructor on Jan. 1, 1919.

The position of chief instructor now rests with R. A. Pierson. Mr. Pierson joined the Los Angeles Railway seventeen years ago. Starting as a motorman, he was soon made a dispatcher, and for the past seven years has been in the instruction department. He will be aided by Daniel Healy, who has been given the title of assistant chief instructor. Mr. Healy has been in the service of the railway for the past sixteen years.

Guy D. Wheelock has been appointed superintendent of schedules. Mr. Wheelock was formerly chief dispatcher.

W. J. Van Valkenburg has been made efficiency statistician. Mr. Van Valkenburg has been in the office of Mr. Anderson, now manager of transportation, for several months past.

A. K. Plummer continues as traffic director. A change will be made in the work of the traffic supervisors by dividing the city into three districts, with a supervisor in charge of each district and certain men assigned regularly to each zone. These three district superintendents are J. G. Owen, J. A. Bodley and W. H. Snyder.

Changes in Alabama Road

J. H. Bowles, master mechanic of the Anniston Division of the Alabama Power Company, has been transferred from Anniston to occupy a similar position with the Gadsden Division. M. D. Payne, superintendent of the Gadsden Division, has been placed in charge of transportation and maintenance of way. These changes come as a step toward a reorganization of the operating end of the street railway in Gadsden as announced by the Alabama Power Company. Division Manager Barry, of Anniston, and J. S. Sutherland, of the main office at Birmingham, will spend several weeks there to personally superintend the work and to study the problems that confront the management.

E. M. Graham, President

Youthful Maine Operator Chosen President of the Bangor Railway & Electric Company

Edward M. Graham was elected president of the Bangor Railway & Electric Company, Bangor, Me., at a meeting of the board of directors on Feb. 9. Mr. Graham has filled the position of vice-president and general manager of the railway, and will continue as general manager. Herbert L. Clark, of Philadelphia, was elected vice-president and E. C. Ryder, the former president, will act as general counsel.

When in 1915 Mr. Graham succeeded his father, the late John R. Graham, as the active operating head of the Bangor Railway & Electric Company the Bangor Power Company, the Orono Water Company and the Bar Harbor & Union River Power Company he was only twenty-six years of age and was one of the youngest general managers in the country to have charge of so extensive a property. The younger Mr. Graham gained his practical knowledge of railway and central station management through an experience of several years under his father.

E. M. GRAHAM

He began his career with the Eastern Massachusetts Street Railway, at that time the Bay State Street Railway, which he served in various capacities. At the age of twenty-two years he was made superintendent of the Portland & Brunswick Street Railway and a little later became assistant to the general manager of both the Lewiston, Augusta & Waterville Railway and the Cumberland County Power & Light Company, these being among the large public service corporations of Maine.

Mr. Graham went to Bangor in 1913 as assistant to his father, then the president and active head of the utility properties centering in that city. He has been with the company there ever since. The companies of which Mr. Graham is now president and general manager operate electric railway lines in nine municipalities, in addition to providing sixteen cities and towns with light and power and six with water.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER,
SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Lower Prices on Pole Line Hardware

Present Demand Light, but Manufacturers Are Hopeful of Good Business Ahead—Prompt Shipments

Following price reductions of 5 to 15 per cent on pole-line hardware that went into effect during December and early January, as mentioned in last week's issue, prices have further declined. General reductions on the entire line, ranging from 5 to 7½ per cent, were put into effect by leading manufacturers on Feb. 15. It is hoped that this reduction will have some effect upon consumers in the way of inducing them to buy, as until the present time demand has been very light. With the closer approach of spring, however, manufacturers are hopeful that the program of extensions on the part of utilities will result in a better market.

In anticipation of this producers are continuing production so as to accumulate reserve stocks. These have been rather low in the past, but should now build up in good shape. Deliveries are considered entirely favorable, being from stock in most instances. In others shipment is not longer than ten days to two weeks.

Insulation Market Remains Quiet

Price Reductions Since First of the Year Have Not Helped Buying—Manufacturers Not Stocking

Little increase has been noted in the buying of fabric insulation and compounds, etc., during the year up to date. Although it is stated that the number of orders which manufacturers are receiving is about normal, at the same time the amount of each order is still disappointingly small. A normal number of bills are sent out each month, but for small figures. Factory production is down pretty near the 50 per cent mark.

Cotton webbings are moving slowly, although recent price decreases of about 18 per cent have been applied. There is some distributer stocking of this class of insulation, as it is thought the bottom price has been reached. Cotton sleeving has undergone several price reductions since the first of the year and is now said to compare favorably with pre-war prices. Compounds of finishing insulated wires are moving fairly well and sales have increased in February over January. Shellacs and varnishes are going slowly.

Varnished silk has little call at present, and its price has held steady since the revisions reported in January. Varnished-cambric tape and cloth are about 10 per cent lower than last quotations made the latter part of January, and the demand is not well sustained. There is little manufacturing for stocks beyond what is deemed necessary to supply immediate future needs. That is, no future production on a large scale is being attempted even with a good outlook for summer business.

Further Decrease in Price of Overhead Line Material

Several Manufacturers Drop Prices 10 per Cent Following General Reductions Made Last Month

Still further price reductions have been made on trolley ears, crossings, splicers, hangers, etc., by several manufacturers. The latest decrease is 5 per cent, effective Feb. 15, and follows reductions ranging from 5 to 15 per cent that were made by almost all manufacturers during the first two weeks of January. Not all producers of overhead line material have announced a new decrease in price, but it seems more than likely that these others will fall in line shortly too.

The market for this class of material remains quiet on the whole, orders being mostly for current maintenance work rather than for the purpose of accumulating stock. Some manufacturers are experiencing a fair current business nevertheless. Deliveries are about all that can be desired.

Charters Granted for Traction Construction in Japan

According to advices from the Guaranty Trust Company of New York, charters have been granted for rail and tramway construction as follows: To the Kanaiwa Electric Tramway for an electric tramway between Ono and Kanaiwa, Ishikawa prefecture; to the Fukutake Electric Tramway for a line between Fukui and Takefu, to the Mito Kaihin Electric Tramway for a line between Mito and Isohama, to the Seto Electric Railway for a line between Nagoya and Seto, to the Motegi Automotive Railway for a line between Nagasaki and Motegei. The Tamagawa Electric Railway has received permission to build a new section between Tamagawa-mura and Kinutamura.

The Yokohama Electric Car Company has applied for permission to extend the electric car line by a double track from Honmoku to the Yawatabasi terminus.

Stock Deliveries Can Be Made on Wood Ties

Demand Is Light as Railroads Are Concerned Over Existing Contracts at High Prices

About the middle of last summer it was stated in these columns that timber owners were loath to cut their trees for railroad ties when so much higher prices could be obtained for board lumber. At the same time labor was comparatively scarce in many tie camps because of the more attractive wages that could be earned at lumber mills. These conditions are now changed materially. The price of board lumber has undergone a considerable decline, while quotations for wood ties cut locally along rights of way remain unchanged. There has been some reduction in prices by large producers who stock and sell ties commercially, it is true, but this reduction is slight and applies where lowered water freight rates have reduced costs. More labor is now available than can be used, but wages, it is stated, have undergone very little reduction.

PRICE SHEETS KEEP DOWN DEMAND

One reason why prices of ties have not declined commensurate with drops in lumber, is because the price sheets issued by the large steam railroads, stating what prices they will pay for ties delivered along the right of way, in many cases cover long term contracts. This factor has aided in cutting down demand as consumers are not anxious to buy ties while quotations are thus artificially maintained.

The market on the whole is extremely quiet just now, but starting this spring producers expect to see a brisk return of buying. They are encouraged in this belief by the large potential need that is known to exist for ties on the part of both steam and electric lines. During the war and since the armistice, buying of wood ties in this country has fallen far below the normal quota that it is estimated must be purchased each year to keep roadbeds in good repair.

The price now in effect, which one of the large steam roads is paying for wood ties delivered along the track, quotes standard white oak ties at from $.95 to $1.85 each depending upon the grade, and chestnut ties from $.75 to $1.50 each. Southern yellow pine ties covering three grades delivered at New York are quoted by a large producer at from $1.10 to $1.65 each.

Deliveries at present are favorable as shipments from storage points in many cases can be made from stock; although the current surplus stocks are kept rather low. For this reason more than one producer is advising its regular customers not to wait until spring before placing orders, as demand coming all at once at that time may very possibly lengthen deliveries.

Lightning Arresters Drop Ten per Cent

Railways Are Not Entering the Market to Cover Spring Needs—Good Stocks and Prompt Deliveries

Price decreases of 10 per cent on railway lightning arresters have been announced by several of the large manufacturers, effective about the middle of this month.

As yet electric railways are not placing orders to cover their spring needs though one large manufacturer states that the volume of inquiries received indicates that they will do so before long. Other producers report an absence even of inquiries, and are not looking for buying, to start until thunderstorms are actually a factor to be reckoned with. Good stocks have accumulated at the factories and deliveries can be made promptly at the present time.

Brill Profits Show Gain in 1920

Total Sales Also Surpass High Mark of 1918, When Company Operated Under Large War Contracts

For the year 1920 the sales value of the combined output of J. G. Brill Company's four plants amounts to $17,537,293, according to the annual report of the company just issued. This is a record figure, as it exceeds both the $14,210,622 total sales of 1919 and the previous high mark of $16,761,154, recorded in 1918, when the company was working under large government war contracts. Profits for the past year, after deducting the sum of $964,090 for depreciation, maintenance and repairs, were $1,415,321, from which must be further subtracted $240,000 to cover unassessed federal income and excess profits taxes, and $150,000 against any possible decrease in assets. This makes the net profit for the year $1,025,321, surpassing both $831,869 in 1919 and $916,509 in 1918. The inventory of all raw material on hand was priced at cost or at the prevailing market price at the end of the year, whichever was lower.

The value of unfilled orders on hand as of Feb. 1, 1921, is $3,670,310, which does not compare very favorably with $6,904,792 and $8,204,448 of unfilled orders on the same date in 1920 and 1919 respectively. In view of the present depressed condition of the market, however, this volume of business to start the year seems by no means unfavorable. In fact, regarding the outlook for the present year the tone of the report, which points out the present great necessity for street railway equipment, is optimistic.

Independent Steel Production on Low Basis

Recent Price Cuts of from $3 to $7 of Many Independent Mills Have Not Acted as Stimulus to Buying

With recent recessions in price of from $3 to $5 and even $7 per ton below the Industrial Board's schedule, made by most of the independent steel mills, there has resulted to date little stimulation to buying. Mills are operating at a very unsatisfactory capacity, down as low as 25 per cent being reported in several instances. The leading interest is reported as operating at about 80 per cent, but there is a feeling in the trade that this capacity will be even lower in the very near future.

In the independent field reductions in wages at mills and fabricating shops are becoming common, from 10 to 20 per cent lower pay being quite general. In many instances this has been done without reducing the hours of labor, while in other instances the working time has been cut sometimes to four days a week while keeping the rate of pay the same. The rate of pay at the mills of the corporation has not been changed and reports assert a holding to published prices.

Most of the price changes seem to affect the semi-finished steel products rather than finished products on which there is a relatively great amount of labor. Steel plates are being quoted on a 2.40-cent base, f.o.b. mill, 25 cents below Industrial Board prices. Structural shapes have declined about $4 a ton to a 2.25-cent base. Reductions have been reported up to $7 a ton on blue annealed sheets, while on the black sheets the drop has been about $3. Galvanized holds better.

Consumers are buying only as it is absolutely necessary. While the unstable conditions remain in the price market, there is a current of opinion that this buying will remain light. There is a tendency to expect a recession in price by the leading producer, in which event it is felt that the market will again come to a more stable level. But with operations on a 75 or 80 per cent level it is reasonable to expect a holding in price as long as production can be maintained probably within twenty points of these figures.

Price Cuts Announced on Electric Railway Material

In addition to the price drops on various apparatus announced by the General Electric Company in last week's issue, there have been other reductions by this company on material in the electric railway field. The reduction, which is dated Feb. 9, is approximately 10 per cent and includes railway motor gear cases, brushholders, carbon brushes, car-type circuit breakers, and car-type fuse boxes.

The Westinghouse Electric & Manufacturing Company, it is stated, has also made slight reductions in price on all the above material within the past two weeks with the exception of carbon brushes, but the specific date and amount are not available.

Rolling Stock

Cairo Electric & Traction Company, Cairo, Ill., states that it expects to purchase three single-truck cars.

Concord (N. H.) Electric Railways announces that it has purchased new H. L. control for six interurban cars.

Brockton & Plymouth Street Railway Company, Plymouth, Mass., reports that it expects to purchase eight fare boxes within the next few weeks.

The Hydro-Electric Power Commission of Ontario, Canada, it is learned, contemplates the purchase of new cars for the city of Windsor, Ont., Canada, and is interested in prices immediately. The estimated amount to be expended is placed at $25,000. A. McGill of Windsor is superintendent.

The City of Philadelphia, Pa., mentioned in the Jan. 8 issue as calling for bids on 100 steel passenger cars for the Frankford Elevated Railway, has awarded the contract to J. G. Brill Company. Only fifty cars are ordered at the present time, with the privilege of ordering as many as fifty more later. The motor control, couplers and draft gear and door operating mechanism will be covered by separate contracts and have not yet been awarded. The remainder of the equipment is as follows:

Number of cars ordered	50
Date, bids opened	Feb. 1, 1921
Delivery to be begun by	July 1, 1921 and completed by Sept. 30, 1921
Builder	J. G. Brill Company
Type	All-steel Motor Car
Seating capacity	52
Weight, total	65,000 lb.
Bolster centers, length	38 ft. 0 in.
Length over all	55 ft. 0 in.
Truck wheelbase	6 ft. 8 in.
Width over all	8 ft. 10 in.
Height, rail to top of roof	12 ft. 0 in.
Body	All-steel
Headlining	Agasote
Roof	Arch
Air brakes	Electro-pneumatic
Axles	Quenched and Tempered Carbon Steel
Bumpers	"Hedley"
Signal system	Bell with rope
Center and side bearings	"Stucki"—Side bearing
Couplers	Automatic Car, Air and Electric
Curtain fixtures	None
Curtain material	None
Door operating mechanism	Pneumatic
Gears and pinions	Gen. Elec.
Hand brakes	Brill
Heater equipment	Electric
Journal bearings	M. C. B. plain
Journal boxes	M. C. B. type
Motors, type and number	General Electric 259 inside hung
Seating material	Rattan
Trucks	Brill
Wheels	34 in. Wrought Solid Carbon Steel

Franchises

Hydro-Electric Power Commission, Ontario, Canada.—Since the Ontario Hydro-Electric Power Commission has refused to consent to a renewal for five years of the franchise of the Grand River Railway on Water Street, in Galt, Ont., the company has served notice that it will discontinue the freight service for manufacturers after March.

2. The City Council of Galt is endeavoring to have the Hydro Commission change its decision, as the loss of the freight service will be a serious blow to the city's industries.

Track and Roadway

Lafayette (Ind.) Service Company.—It is proposed to build a new curve to the tracks of the Lafayette Service Company in the southeast part of Lafayette and have the interurban cars of the Terre Haute, Indianapolis & Eastern Traction Company go down South Ninth and Kossuth Streets. Excavations for street improvements in East Main Street have resulted in the railway tracks being undermined and it is over these tracks that the cars of the Terre Haute, Indianapolis & Eastern Traction Company run.

Trenton & Mercer County Traction Corporation, Trenton, N. J.—The Trenton & Mercer County Traction Corporation will expend $300,000 for maintenance and replacement during the coming year, according to President Rankin Johnson. The company will have 15,000 new ties placed, 300 tons of new rails, 300 poles and ten miles of new trolley wire. Considerable special work will be installed at West State and Prospect Streets.

Orleans-Kenner Traction Company, New Orleans, La.—Officials of the Orleans-Kenner Traction Company have been ordered to remove the spur track in the roadway of Rampart Street. Commissioner Maloney has informed the president of the company that the franchise for the use of the spur track expired two years ago.

Claremont Railway & Lighting Company, Claremont, N. H.—The Claremont Railway & Lighting Company expects to rebuild 1 mile of old track substituting A. S. C. E. 70-lb. rail with Weber joints for old 56-lb. rail with angle bars.

Oklahoma Union Railway, Tulsa, Okla.—The Oklahoma Union Railway, extending from Tulsa to Keifer, is planning to build an extension to Okmulgee as soon as financial conditions improve, according to I. F. Crow, of Tulsa, secretary and general manager of the line. The proposed extension will pass through Beggs and the Beggs oil district. It will be about 50 miles in length.

Texas Electric Railway, Dallas, Tex.—The Texas Electric Railway, which owns and operates the street car system in Waco, Tex., has installed a block signal system on one of its lines as a measure of safety in operation, and announces it will so equip other lines in the city. The block signal system has proved most effective in preventing accidents and making for absolute safety in operation.

Toronto, Ont. — The transportation commission of Toronto will ask the Ontario legislature for power to construct street railway extensions as local improvements and charge the cost to the properties benefited by such extensions. According to this plan adjacent townships would also be called upon to bear their share of the expenditure.

Citizens Railway, Clarksville, Tenn.—The Citizens Railway within the next month will extend its tracks a distance of 2 miles, and in this work 65 to 80 lb. rail will be used.

Burlington (Vt.) Traction Company.—The Burlington Traction Company expects to reconstruct 2 miles of its track in the early summer. Seventy-lb. rail has been ordered for May delivery.

Power Houses, Shops and Buildings

Cairo Electric & Traction Company, Cairo, Ill.—The Cairo Electric & Traction Company will purchase in the near future a motor generator set and rotary converter.

Claremont Railway & Lighting Company, Claremont, N. H. — The Claremont Railway & Lighting Company has purchased and is now installing two-300-kw. rotary transformers.

Charlottesville & Albermarle Railway, Charlottesville, Va. — The Charlottesville & Albermarle Railway within the next month will build an addition to its power plant for installing substation equipment and switchboards.

Concord (N. H.) Electric Railways.—The Concord Electric Railways has purchased new H. L. control for six interurban cars. Complete equipment has also been purchased for one 300-kw. motor generator set.

Brockton & Plymouth Street Railway, Plymouth, Mass.—The Brockton & Plymouth Street Railway will build a substation at Kingston and will purchase one 22,000-volt oil switch.

Evansville & Ohio Valley Railway, Evansville, Ind.—The Evansville & Ohio Valley Railway, has leased the building adjoining the one it now uses as a station at Rockport, Ind., and will remodel, enlarge and convert the building into a suitable station.

Trade Notes

The Alloy Metal Wire Company, 154 Nassau Street, New York City, has filed notice of increase in capital stock from $100,000 to $200,000.

The American Steel & Wire Company, Chicago, is planning to build a three-story addition to its plant in Worcester, to cost about $150,000.

The American Insulated Wire & Cable Company, Chicago, has recently purchased a one-story building at Twenty-second and Fisk Streets, containing 40,000 sq.ft., which will be remodeled and used as a copper-wire rod mill. New equipment to cost about $250,000 will be installed.

The Atlas Valve Company, 282 South Street, Newark, N. J., announces that the company has acquired by purchase from the Ideal Automatic Manufacturing Company the sole patents and rights to manufacture the Ideal automatic pump governor. This rounds out the company's line of valves, pump governors, regulators, etc.

The Cleveland Belting & Machinery Company, 1504-24 University Road, Cleveland, manufacturer of engines and boilers, generators, motors and belting, has enlarged its storage space by an addition 65 x 320 ft. The company says that its business is beginning to improve and expects it will continue to increase from now on.

The Jeffery-Dewitt Insulator Company, Huntington, W. Va., has just put into operation a new kiln which with its supporting accessories will double the insulator capacity of the plant. In addition, in order to have a continuous source of raw material and to be independent of the market for feldspar, the company has purchased its own feldspar mine.

The Acorn Insulated Wire Company, 73 Richards Street, Brooklyn, N. Y., has acquired the plant of the Davis Oil Company on Ninth Street, extending to the Gowanus Basin bulkhead, for a new plant for the manufacture of insulated wire and other products. The property is 146 ft. x 380 ft., improved with five-story buildings, and has been held at about $150,000.

The Black & Decker Manufacturing Company, Towson Heights, Baltimore, Md., announces the opening of a new branch office and service station at 75 Fremont Street, San Francisco. This office will have jurisdiction over the entire Pacific Coast territory and will be in charge of M. A. Johnson. At this address there will be a complete stock of parts carried and a factory-trained mechanic will be on hand.

New Advertising Literature

Metal.—"Monel Metal" is the title of a twenty-eight-page booklet published by the International Nickel Company, 43 Exchange Place, New York City.

Foundry Ladles.—The Whiting Corporation, Harvey, Ill., has issued catalog No. 156, superseding No. 147, covering its foundry ladles.

Electric Rivet-Heating Forge.—The United States Electric Company, New London, Conn., has issued bulletin No. 5, on its electric rivet-heating forge.

Transformers.—The Wagner Electric Manufacturing Company, St. Louis, Mo., has issued bulletin 124, covering its different types of transformers.

Cords and Fixtures.—The Inland Electric Company, 15 N. Franklin Street, Chicago, has issued a folder on Steelite armored portable extension fixtures.

Transformers.—The Esterline Company, Indianapolis, Ind., is distributing a four-page leaflet describing its new portable multi-range current transformers rated at from 25 amp. to 800 amp.

Check Up Your Own Brake Equipment

A leading editorial in the Jan. 15 issue of the ELECTRIC RAILWAY JOURNAL, says: "A little study and analysis will show many minor details in maintaining foundation brake rigging which would, if neglected, lead to serious accidents or at least to a decrease in the efficiency of the braking equipment."

Moreover, study and analysis of braking equipment will show many operators, especially those using safety cars, that it is a very serious matter not to have the best protection possible, i.e. both the air brake and the hand brake.

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More revenue from more riders
143 Crary Ave., Mt. Vernon, N. Y.

DAY & ZIMMERMANN, INC.
ENGINEERS
Design, Construction
Reports, Valuations, Management
NEW YORK PHILADELPHIA CHICAGO

THE P. EDWARD WISH SERVICE
50 Church St. NEW YORK
DETECTIVES
Street Railway Inspection
131 State St. BOSTON

A. L. DRUM & COMPANY
CONSULTING AND CONSTRUCTING ENGINEERS
VALUATIONS AND FINANCIAL REPORTS
CONSTRUCTION AND MANAGEMENT OF ELECTRIC RAILWAYS
76 West Monroe St. CHICAGO, ILL.

ELECTRICAL TESTING LABORATORIES
Electrical, Photometrical and Mechanical Testing
80th Street and East End Ave., New York, N. Y.

JAMES E. ALLISON & CO.
Consulting Engineers
Specializing in Utility Rate Cases and Reports to Bankers and Investors
Security Building, St. Louis, Mo.

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.

Chillingworth

One-Piece Gear Cases

Chillingworth End Supported Gear Case

Chillingworth Gear Cases are made from deep drawn open hearth steel:

Seamless — Protecting your gears and pinions from water, mud or dirt, and preventing oil leakage.

Rivetless—Making them immune to loosening from vibration.

Light Weight—40% lighter than malleable iron cases and more durable, since on bad roadbeds, where a malleable iron case would smash, a Chillingworth merely dents.

Fitted with Chillingworth Malleable Iron Brackets that hold them securely to the motor frame. Especially designed to withstand vibration and ordinary rubbing over obstacles in the roadbed.

Chillingworth Side Supported Gear Case

Chillingworth Manufacturing Company

Jersey City, N. J.

Sales Department: Thayer and Company, Inc., 111 Broadway

Photo of a car of P & H Guaranteed Penetration Process poles shipped to
Omaha & Council Bluffs Street Railway Co., Omaha, Neb.

Discriminating Pole-Users Demand P&H Guaranteed Penetration Process

The great demand shown for the P&H Guaranteed Penetration Process is positive proof of its value and desirability. This demand is convincing evidence that pole buyers are getting something that has never been available before in the pole-industry,—a guaranteed penetration process.

The above photo is convincing testimony of one of the many endorsements received from enthusiastic buyers of the P&H.

In all parts of the country pole-users are demanding the first and original guaranteed penetration process,—the Page & Hill.

Accept No Substitute Process *Demand the P & H*

List of users sent upon request.

PAGE & HILL CO., Minneapolis, Minn.

BRANCH OFFICES:
Times Bldg., NEW YORK, N. Y.
717 Bryant Bldg., KANSAS CITY, MO.
19 So. LaSalle, CHICAGO, ILL.
1111 Carter Bldg., HOUSTON, TEXAS
311 Sumpter Bldg., DALLAS, TEXAS
1416 Starks Bldg., LOUISVILLE, KY.

Originators of the P & H Guaranteed Penetration Process. Producers manufacturers and foremost in the Butt-Treatment of poles.

Butt-Treated BY PAGE & HILL CO 1921 GUARANTEED One-Half Inch PENETRATION

PAGE & HILL CO.
Guarantee of Penetration

The undersigned guarantees that every pole which bears the above brand, shipped on our order No.________ Car No.________ Initials________________has been impregnated with the preservative to a depth of one-half inch in every portion of the pole in that area between the plane designated as the height of treatment to a plane one and one-half feet below the standard ground line, unless the sapwood is less than one-half inch in thickness, in which case the impregnation is to the full depth of the sapwood.

It is further guaranteed that the Butt-Treating price will be refunded on any pole which when tested in accordance with the specifications for Butt-Treating Cedar Poles, P & H Guaranteed Penetration Process, does not show the penetration as herein specified.

This guarantee is effective provided only the attached coupon is signed and returned to Page & Hill Co., at Minneapolis, Minn., within five days from the date shipment arrives at destination and that any claim for refund under this guarantee is filed with Page & Hill Co., at Minneapolis, Minn., within thirty days thereafter.

PAGE & HILL CO.

No.________ By________________

Putting Pulling Power into the Business Paper

FOR the third time since January an *Electrical World* editor is traveling from New York to California in active co-operation with the National Electric Light Association. Three other *Electrical World* editors have made the trip from the Atlantic to the Pacific in the same period, scouring up and down the states between for facts and figures of essential importance to electrical engineering and commercial interests.

Out of the power plant world a demand, multiplied and insistent, comes for information on oil engines. As a result, a noted authority on Diesel and semi-Diesel engines is added to the editorial staff of *Power*. He is sent out to visit all important installations of these engines throughout the country. Over three months of travel and study will be spent by this *Power* editor solely to gain for *Power* readers a fuller knowledge of oil engines operating performance under all possible service applications and conditions.

A McGRAW-HILL man representing *Engineering & Mining Journal*, after having been forced out of Mexico by warring factions, has again plunged into that turbulent country to learn and report actual conditions affecting mining and oil well operations and prospects and equipment opportunities.

An editor of *Ingenieria Internacional* comes back from a long trip through the countries of South America bringing much valuable data on trade conditions, engineering and industrial development, and equipment requirements.

American Machinist recently sent one of its executives on a tour of Europe to study the metal-working industries abroad for the benefit of similar industries and machine-tool manufacturers at home.

An editor of *Engineering News-Record* also has just returned from Europe where he has been investigating engineering practice and equipment usage and needs in the construction field.

General departure from rule-of-thumb methods is an urgent need of the chemically controlled industries. To this end *Chemical & Metallurgical Engineering* has made an exhaustive investigation on which is founded one of the most significant and important issues of any publication in the engineering and industrial press—the September 8th "Convention" issue of *Chemical & Metallurgical Engineering*.

Electrification of steam railroads is a question pregnant with transportation improvement possibilities in this country. So an *Electric Railway Journal* editor recently made an extended trip over the system of the Chicago, Milwaukee & St. Paul R.R. to study this famous achievement in railroad development. Returning east this editor made a sweeping tour of Canada, getting data vitally interesting to American electric railway men and builders of electric railway material on today's methods, equipment, plans and outlook of the foremost Canadian electric railways.

The extraordinary success of *Electrical Merchandising* since its inauguration in 1907 is largely due to the indefatigable field work of the editors. These editors comb the continent with their journeys. They are constantly in personal contact with the electrical dealers, jobbers and contractors. They meet them at their conventions, clubs, clambakes, summer camps, offices, stores, warehouses and homes. They are keeping in touch with movements and materials and markets and methods and men—helping these men individually and through their organization.

Industrial, agricultural and commercial development of the West beyond the Rockies depends in large measure on the development of electricity from water power. To promote the industrial development of these great States with their specialized problem, McGRAW-HILL service to the electrical field was expanded in September, 1919, by the purchase of the *Journal of Electricity*. The acquisition of this publication demonstrates that McGRAW-HILL service, when conditions require, is intensive, as well as comprehensive.

As an editor of *Coal Age* recently wrote, "Read your *Coal Age* closely, and you will see that no stone is being left unturned to make *Coal Age* a mirror of the industry, to make the achievements and experience of some enterprising individual somewhere the pivotal point for an advance of the entire craft."

THIS is the policy that governs ALL McGRAW-HILL publications. It picks the ablest men as editors. It sends them out into the fields served by those publications. It bids them seek the problems of those fields. And through their publications these editors lead and co-ordinate the search for the answer to those problems.

That is the kind of service that puts pulling power into a business publication.

That is why McGRAW-HILL publications are dominant in their fields.

That is why they are read—with care and respect—by the biggest men in those fields.

And that is why they exert the influence on those men that makes advertising in McGRAW-HILL publications productive.

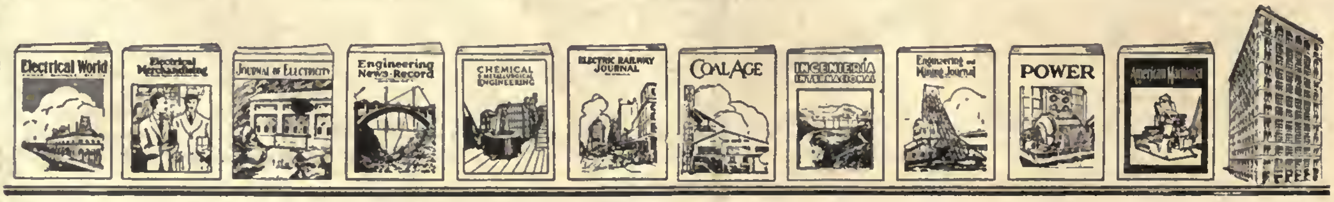
McGraw-Hill Company, Inc., Tenth Avenue at 36th Street, New York

American Machinist
Power
Electric Railway Journal

Electrical World
Journal of Electricity
Electrical Merchandising

Engineering News-Record
Coal Age
Engineering & Mining Journal

Ingenieria Internacional
Chemical & Metallurgical Engineering



FLOODLIGHTS

Have "Daylight" in Yards for Night Work

THIS illustration shows a factory yard illuminated almost as bright as day with Imperial Floodlight Projectors so that work can be done at night.

These floodlights are used by contractors, mill and factory owners, railroads, ship-builders, etc. for night construction work and protection.

They can be connected to any incandescent lighting circuit, are easily installed, illuminate a wide area, and are easily maintained.

Send for floodlight catalog No. 304.

CROUSE-HINDS COMPANY
SYRACUSE, N. Y.
BOSTON NEW YORK CHICAGO
Condulets Panelboards
Knife Switches Floodlights
Guy Anchors
1598

IMPERIAL FLOODLIGHT PROJECTORS
are scientifically designed to take lamps from 100 to 1000 watts.

CROUSE-HINDS

Safety car operation in Springfield, Mass., with Miller Trolley Shoes.

"There was far less arcing with the sliding shoe than with the wheel trolleys."

Thus reads a conclusion of a test made by an authority on a number of different trolley wheels and on Miller shoes.

It is just such conclusions as these that are continually winning many safety car operators over to the Miller Trolley Shoe.

If you'll make your slogan "Miller Shoes for Safety Cars or any other type" then you'll soon begin to reap the benefits, which are:

1. **No smashed overhead or breakage of trolley.**
2. **No arcing or burning trolley in two.**
3. **No limitation on use of steel or composition wire.**
4. **No broken trolley poles.**
5. **No traffic interruptions because of dewirements.**

Write Today for Details

Miller Trolley Shoe Co., West Newton, Mass.

SPECIAL REPRESENTATIVE: Holden & White, Inc., Chicago

EASTERN REPRESENTATIVE: National Railway Appliance Co., New York

SALES REPRESENTATIVES:

Alfred Connor
Denver, Colo.

T. C. White & Co.
St. Louis, Mo.

F. F. Bodler
San Francisco, Calif.

W. M. McClintock
St. Paul, Minn.

S. I. Wailes
Los Angeles, Calif.

W. F. McKenney
Portland, Oregon

10 Agasote Advantages

Advantage No. 2

It holds paint as well or better than steel or wood

An AGASOTE Car Roof will *take* and *hold* paint as well or better than steel or wood. You can paint directly on the AGASOTE without pre-coating it or covering it with canvas. Those things are of great importance in these days of high labor charges and high cost of materials. A car with an Agasote Roof is *kept out on the line* instead of going to the barn at intervals for repainting—in fact, years elapse between the periods when an Agasote Roof needs any kind of attention.

We also manufacture Pantasote Curtains, practically the *standard* in the car world today.

The Other 9

1. Is absolutely Weatherproof.
2. Has Great Strength.
3. Is light in Weight.
4. Makes a Cheaper Roof than Wood.
5. Requires No Auxiliary Coating or Covering Such as White Lead and Canvas.
6. Is an Absolute Non-conductor of Current.
7. Has High Insulation Value Against Temperature.
8. Saves Time.
9. Saves Labor.

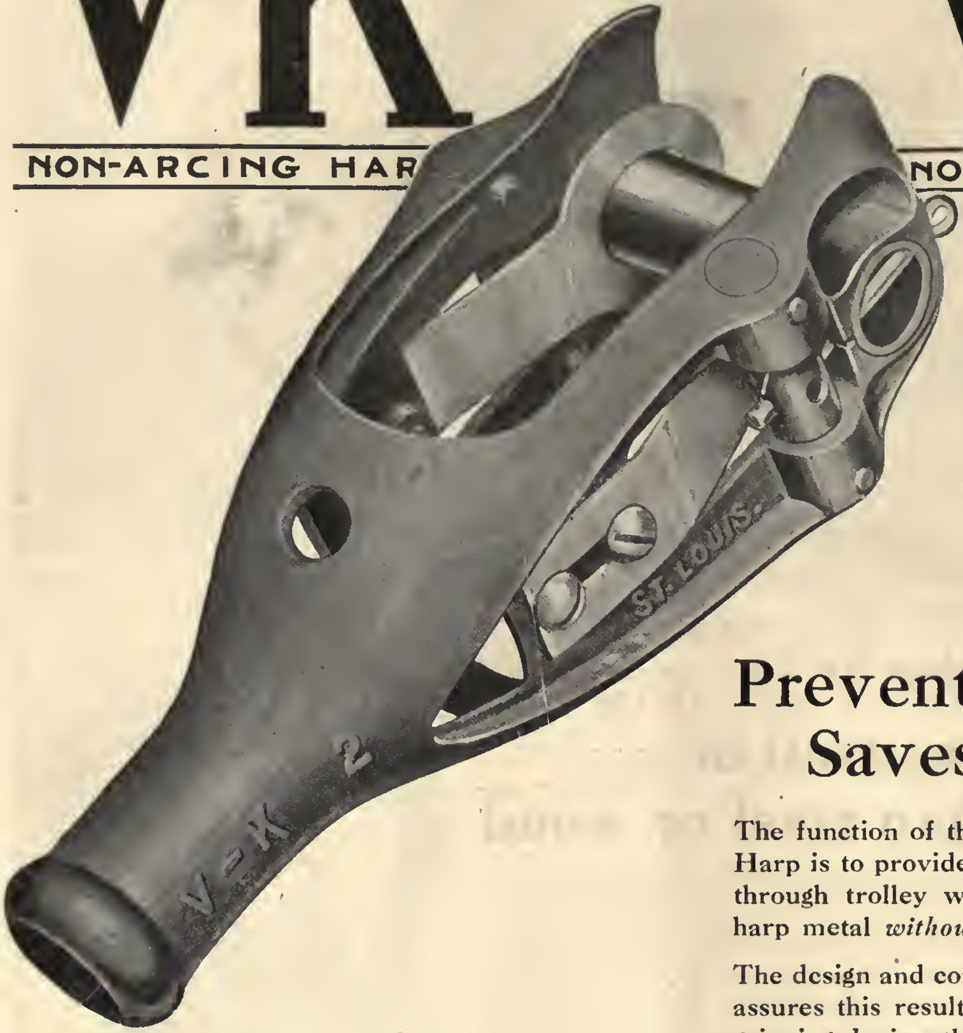
THE PANTASOTE COMPANY

11 Broadway, N. Y. People's Gas Bldg., Chicago, Ill.
751 Monadnock Bldg., San Francisco, Calif.

AGASOTE
TRADE MARK
ROOFING

V-K V-K

NON-ARCING HAR NON-ARCING HARP



Its employment on any trolley pole will add at least 25% to the life of the wheel. An installation will verify this statement.

Prevents Arcing—
Saves Current—

The function of the V-K Non-arcing Trolley Harp is to provide for the passage of current through trolley wheel and bearing into the harp metal *without loss through arcing.*

The design and construction of the V-K Harp assures this result. By means of a patented gripping device, the axle pin is held firmly in place, thus eliminating all possibility of arcing between pin and harp.

V-K Non-arcing Harps used with V-K Oilless Trolley Wheels will materially reduce operating and maintenance costs on your property. "Trolley Wheels" contains complete data. Write today and permit us to mail you a free copy.

More-Jones Brass & Metal Co.
St. Louis, Missouri

TROLLEY WHEELS:
V-K Oilless, M. J. Lubricated
HARPS: V.K. *Non-Arcing*
BEARINGS: *"Tiger" Bronze*
Axle and Armature
ARMATURE BABBITT
and Similar Products

MORE-JONES

What is *your* company in business for?

"We are in business not only:
—to render service by building a better product,
—to make a reasonable profit,
—*but also to build and train better men.*"

So says Mr. F. H. Payne, Vice-President of the Greenfield Tap and Die Corporation.

"THE growth of our company naturally creates many new openings for men to enlarge their opportunities and value," continues Mr. Payne. "We believe it is much better that the members of our own organization should develop themselves to grasp these opportunities, rather than for the company to go outside of the organization when new men are needed."

Profit by experience of others

FROM Vice-President and Treasurer down to order clerk, 50 men in the Greenfield Plant have enrolled for the Modern Business Course and Service of the Alexander Hamilton Institute.

These men are insuring their future growth. They realize that a wider, sounder knowledge of the fundamentals of *all* business is the surest and shortest road to greater achievement. They appreciate that no matter how big a man's position—no matter how small—a man must absorb knowledge from the experience of others.

L. M. Lamb, Treasurer of the Company, emphasizes this need and substantiates Mr. Payne's remarks by writing us as follows:

> "We are firm believers in the advisability of our employes pursuing this Course. We think it is the most comprehensive and exhaustive treatise on modern business that has come to our attention."

All industries represented

LARGE industries, in every channel of trade, are encouraging their executives, department heads, salesmen and juniors to train themselves to be better business men—sounder thinkers—keener workers, by mastering the basic principles of *every* department of business. *Trained* thinkers pay big dividends in the way they increase production, cut costs and add to profits.

You cannot name a great American business which has not its quota of Alexander Hamilton Institute men. There are enrolled in the United States Steel Corporation 545; Goodyear Tire and Rubber Co. 439; Srandard Oil Co. 801; Western Electric Company, 254; and so on thruout every nationally known organization.

Keen-visioned executives stimulate self-training among their employes, because their need for *men who know* is ever present and urgent. Presidents of big industries enrol themselves along with the officials with them.

How many men in your company are training for greater responsibility?

LOOK around you. You will see a few men who are reaching out for knowledge outside their technical departments; who are seeking to know the industry as a whole.

These are the men who are building and training for the big positions. They are the ones who are being watched by the officers, who are always looking for ambitious men to promote.

The Modern Business Course and Service gives in easily readable, convenient and compact form, the practical experience of thousands of successful men. By absorbing this knowledge in your spare time your mind and energy are directed along sound lines to greater success.

"Forging Ahead in Business"

A BOOK of 116 pages explains in detail the Modern Business Course and Service of the Alexander Hamilton Institute. It tells just what the Course covers; just how it is arranged, and precisely how its training builds onto the foundation which technical experience lays. To receive your copy of "Forging Ahead in Business," merely fill in the coupon and mail.

Alexander Hamilton Institute
136 Astor Place, New York City

Send me "Forging Ahead in Business," which I may keep without obligation.

Name ....
Print here

Business Address ....

....

Business Position ....

Canadian Address, U. P. R. Building, Toronto; Australian Address, 8a Castereagh Street, Sydney

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AXLES, GEARS and WHEELS

These are some of the most important parts of street railway, elevated railway and interurban equipment and it is imperative that they stand up under the severe service conditions of every-day use. The failure of any one of these parts, especially during rush hours and peak load, means not only a tie-up and delay but also financial loss and causes bad feeling on the part of your passengers.

We make AXLES, ROLLED and FORGED GEAR BLANKS, and ROLLED STEEL WHEELS to meet every requirement of electric railway service. Our products are of the highest grade and backed up by many years of successful experience in dealing with this important branch of transportation.

Specify Midvale and Cambria products.

MIDVALE STEEL AND ORDNANCE COMPANY
CAMBRIA STEEL COMPANY

MIDVALE

CAMBRIA

General Sales Office: Widener Building, Philadelphia, Pa.

District Sales Offices:
Atlanta, Boston, Chicago, Cincinnati, Cleveland, Detroit, New York, Philadelphia, Pittsburgh, San Francisco, Salt Lake City, Seattle, St. Louis

Sole Export Representatives:
Consolidated Steel Corporation, 165 Broadway, New York
All export inquiries should be sent to this address

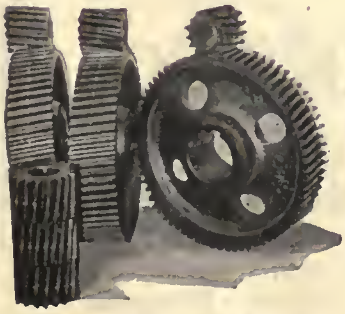
"Tool Steel" Quality **T. S. Q.** "Tool Steel" Quality

White paint illustrates softened end of teeth on motor side of pinion. This eliminates chipping.
(Patent pending)

Remember

"Tool Steel" = Quality
guaranteed and proven
in

SPUR and HELICAL
gears and pinions.



"Tool Steel" Helical gears—in sets, or interchangeable with other makes.

"Tool Steel" Quality **T. S. Q.** "Tool Steel" Quality

"STANDARD"

Steel Tires

Steel Tired Wheels

Solid Rolled Steel Wheels

O. H. Steel and Malleable Iron Castings

Solid Forged Geared Blanks

Steel Forgings Iron Forgings

Forged and Rolled Steel

Pipe Flanges

Ring Dies

Rings

Roll Shells Steel Springs

"The 'Standard' Brand on your material is an assurance of eventual economy."

STANDARD STEEL WORKS CO.

GENERAL OFFICES:

500 NORTH BROAD ST., PHILADELPHIA, PA.

CHICAGO
ST. LOUIS
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ST. PAUL

RICHMOND
SAN FRANCISCO
NEW YORK
HOUSTON

MONTEREY, MEX.
MEXICO CITY
LONDON, ENGLAND
PARIS, FRANCE

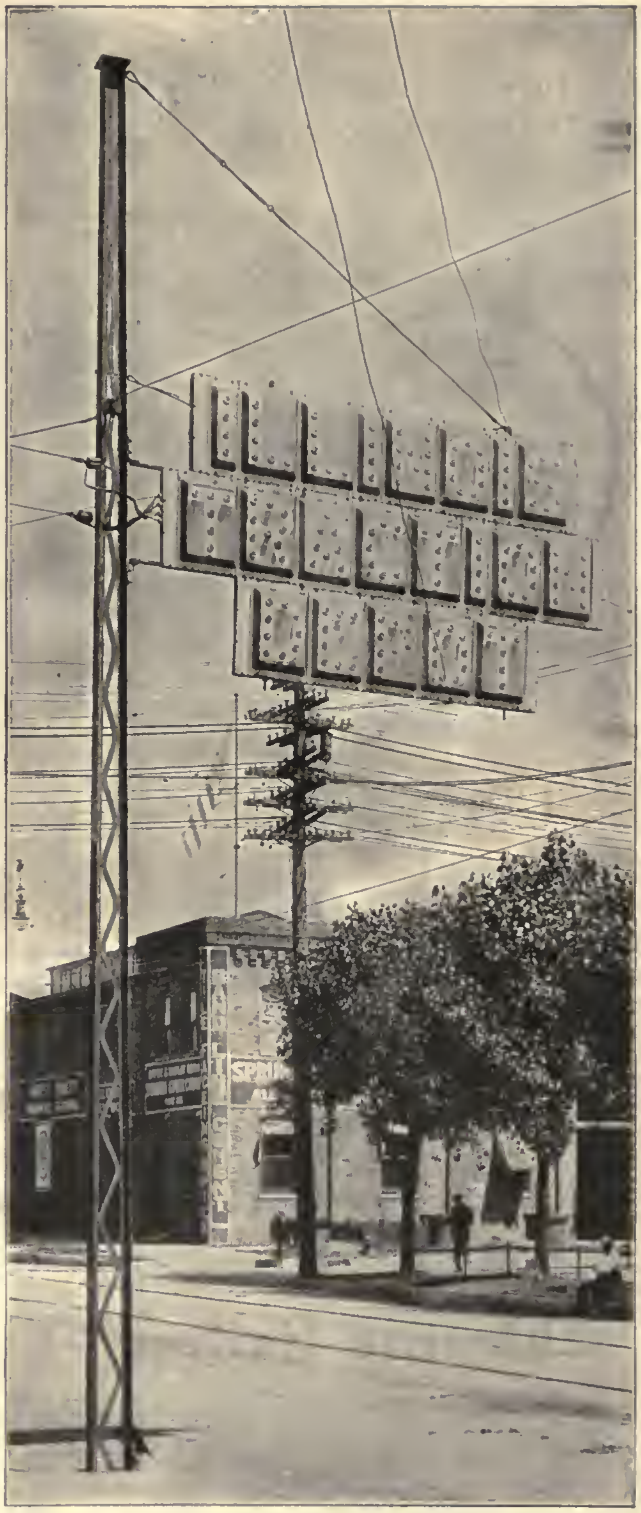
Eternal Vigilance
is the price of
EFFICIENCY

Don't wait till those defects cause trouble

Get your inspectors to work and find and remedy those defects before they disturb your operating schedule. The Bayonet Method is to always have a trolley harp head and wheel that have been inspected, repaired and lubricated ready to exchange with the one on the pole, or if it is the pole that needs attention, then a pole completely fitted out with a properly adjusted and lubricated trolley is always ready for replacing the one in the base. Only TEN SECONDS are necessary to change the harp and wheel and less than ONE minute to change the entire pole.

The road that shows the highest efficiency and keeps its cars running closer to schedule is more liable to have the sympathy of the public when fare increases are being agitated.

Bayonet Trolley Harp Co.
Springfield, Ohio



Bates One-piece Poles Are Artistic

Perhaps Art is a secondary consideration when you plan your pole line construction, but it cannot be disregarded—especially when these poles are to be installed in exclusive residential districts or on your business blocks.

The combination of great utility and art with the lowest first cost makes the Bates Poles desirable for all types of pole line construction.

Our New 1921 TREATISE AND HANDBOOK sent upon request.

Bates Expanded Steel Truss Co.

208 South La Salle Street
CHICAGO, ILLINOIS

They eliminate
the human
element

—the Signals that
prevent accidents
—not "cure" them

United States
Electric Signal Co.
West Newton, Mass.

Representatives:
Western: Frank F. Bodler, Monadnock Bldg., San Francisco. Foreign: Forest City Electric Services Supply Co., Salford, England.

Remember—

ANDERSON

For—

Electric Railway - Light - Power - Specialties

Some Suggestions

Aetna Insulation
Third Rail Insulators
Crossings, Frogs
Harps, Wheels, Trolley Bases
Section Switches, Switchboard Appliances
Plugs and Receptacles
Automatic Time Switches

To promote the safety of your employees and public and advance the efficiency of the operating and maintenance department is the scope of the line of products stamped "ANDERSON." Years have been devoted by us to manufacturing Switchboard, Line, Car and Station Equipment, in which time we have achieved the good will of a large number of traction companies.

See first if we make it.

ALBERT & J. M. ANDERSON MFG. CO.
289-293 A Street (Established 1877) Boston, Mass., U. S. A.

THE

U-RE-LITE

A modern Circuit Breaker to meet modern conditions. An I-T-E Circuit Breaker in a steel box: so much better than a fused switch that it is in a class by itself.

It opens instantly on the occurrence of a short circuit or a predetermined overload and can be as instantly reset, but it cannot be closed if the overload continues on the line.

IT DOES AWAY WITH THE CONSTANT EXPENSE AND THE DAMNABLE ANNOYANCE DUE TO THE USE OF FUSES, FOR THE CRY "FUSE BLOWN" MEANS IDLE MEN. It greatly diminishes the possibility of fire from electrical causes and affords positive protection to employees as well as to light or power circuits.

Made in capacities of 60 amperes and under for D.C. circuits of 250 volts or less and A.C. circuits of 250 volts or less, single phase.

Each pole is closed by a slight turn of the handle, which is seen projecting above and below the tripping knob, by means of which the U-RE-LITE may be opened manually.

First to the left,
Then to the right,
Turn the handle
And U-RE-LITE.

LITERATURE UPON REQUEST

The Cutter Company
PHILADELPHIA

The practical application of a designing engineer's experience to the problems of operating engineers, armature winders and repair men, presenting practical questions arising in winding and reconnecting alternating current motors—such a book is

Connecting Induction Motors

By A. M. DUDLEY

Manager, Automotive Engineering Dept.,
Westinghouse Company

252 pages, 6 x 9, 289 illustrations, $2.50

Do you know how

To connect an induction motor winding to meet any condition of voltage, phase, frequency and speed?
To check this reconnection?
To draw a diagram for any winding?
To locate defects?
To figure a new winding for an old core?
Frequency affects winding and r.p.m.?
Performance is affected by a change in winding?

Dudley will tell you. Practical diagrams and worked out examples—information needed on the job—are contained in this new book.

Examination is FREE

No need to send money until you see the book. Mail the coupon below for your copy.

FREE EXAMINATION COUPON

McGraw-Hill Book Co., Inc.,
370 Seventh Avenue, New York, N. Y.

You may send me on 10 days' approval Dudley's Connecting Induction Motors, $2.50 net, postpaid.

I agree to pay for the book or return it postpaid within 10 days of receipt.

Regular Subscriber to Elec. Ry. Journal?......................
Member of A. I. E. E.?......................
(Signed) ....
(Address) ....
(Name of Company) ....
(Official Position) ....

(Books sent on approval to retail customers in the U. S. and Canada only.) E 2-19-21

Cleveland Window Catch

THIS photograph shows the extremely simple construction of the Cleveland Window Catch. No springs—no delicate parts to get out of order and cause trouble. It prevents the window from falling and eliminates broken glass and cracked sashes.

Write today for sample order, or, if you prefer, send for complete data and prices

The Advance Manufacturing and Tool Co.

Cleveland, Ohio

Electric Railway Equipment

for all classes of service

City and Interurban Cars and Trucks
Snow Sweepers and Plows

Express, Combination and Work Cars
Electric Locomotives

McGuire-Cummings Mfg. Co.

General Offices: 111 West Monroe St., Chicago

Power Transformers
for Any Service, Size or Voltage

One of Six 2500 Kva. 101-200 Volt Out-door Type Transformers Giving Successful Service.

Allis-Chalmers Power Transformers are used for many of the largest transmission and distributing systems of the country.

ALLIS-CHALMERS MANUFACTURING COMPANY
Milwaukee, Wisconsin, U. S. A.

DOSSERT CONNECTORS

From the Giant Power Plant to the Little Safety Car

The picture on the left was taken in the Great Falls plant of the Montana Power Company. It shows Dossert Connectors used for making taps in bus bar compartments. This plant furnishes the power for the great C., M. & St. P. electrification.

The other photo shows a Dossert 3-way Connector installed on a Safety Car of the Third Avenue Railway, New York.

No matter what service, great or small, there is a Dossert Connector that will do the work more easily, more quickly and for less money—and will give better connections.

DOSSERT & COMPANY
242 West 41st Street, New York

K-10 fingers with tip unlocked

All you scrap when tips are worn out on both sides

Never Make a Big Repair When a Little One Will Do

You would think it the height of folly to scrap a controller because a finger had worn out, wouldn't you?

Then why scrap a controller finger simply because the tip has worn out? The principle is the same. Triggerlock fingers are designed to eliminate just that waste of material, money, and shop time necessary for the installation of new fingers.

The finger lasts indefinitely, and with a stock of interchangeable renewal tips it becomes almost a permanent part of the controller.

There is a triggerlock finger for every type of controller. Yours is among them.

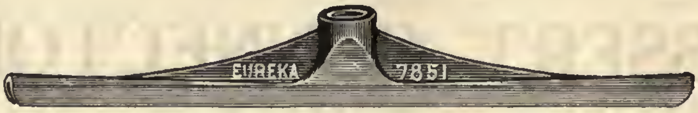
Start the new year right.

Write for catalogue, or put in a requisition now.

Russell Manufacturing Co.

814 Bath Ave.
Niagara Falls, N. Y.

557 King St. West
Toronto, Canada



Eureka Quality

in trolley wheels, bushings, controller fingers, etc., is guaranteed because they are made right from our own special alloys. Every bit of metal used, whether it is brass, phosphor bronze or copper is new. We use no scrap — our castings are homogeneous throughout and can be depended upon.

Contact Fingers
Trolley Wheels
Brush Holders
Sleet Cutters
Bearings
Bushings
Copper Forgings
Bronze Forgings
Castings
Commutators
Wire Stretchers
Line Ears

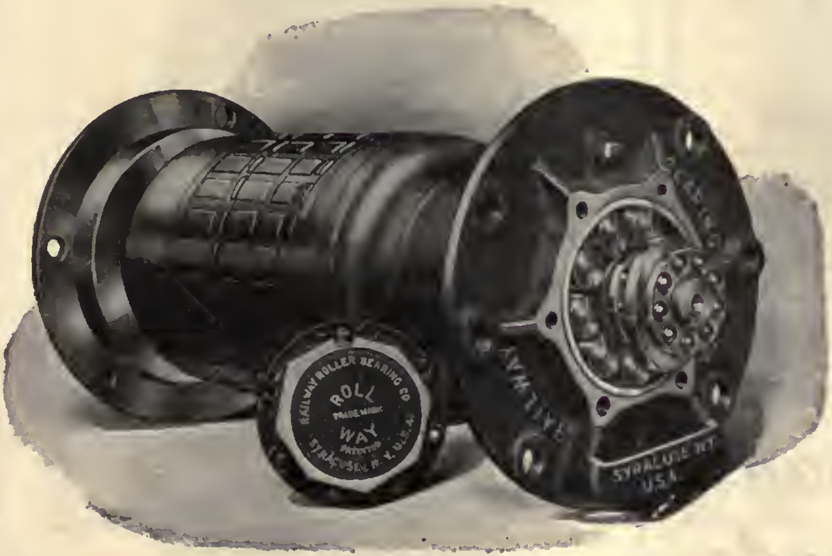
What are you needs?

NORTH EAST, PA.

The Eureka Co.

120 Broadway, New York

Better Service and Less Power with ROLLWAY BEARINGS

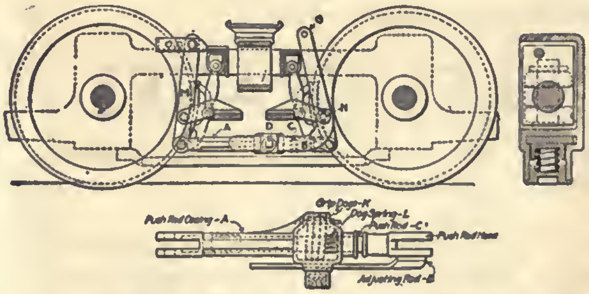


Scores of traction companies are giving their patrons improved service by cutting down running time and at same time using less power by equipping their cars with Rollway Bearings.

The tremendous reduction of friction makes acceleration easier, speeds up the schedule and reduces power consumption. Easily equipped. We have some mighty interesting data for you. Better write for it today.

The Railway Roller Bearing Co.
Syracuse, N. Y.

The Same Braking Power at all times with GOULD Slack Adjusters



DETAILS OF THE GOULD TYPE SLACK ADJUSTER AS APPLIED TO AN ELECTRIC CAR TRUCK

Their use means SAFETY at all times in braking. A predetermined piston travel is always maintained. And they are economical. All manual adjustment of brakes is done away with, less power consumed in car operation and a great saving in the wear and tear of car equipment is effected.

Gould Slack Adjusters pay for themselves in a very short time.

GOULD COUPLER COMPANY

30 East 42nd Street, New York *Works: Depew, N. Y.* Rookery Bldg., Chicago

For Long Spans and Heavy Loads

In the railroad shop where heavy duty is paramount the right crane is essential.

NILES CRANES

For years have proven their ability to stand up under all conditions of service.

Where the building construction is such that the standard design will not be practical we can design and build a crane to fit the job.

Accessible bearings are thoroughly oiled, thus reducing wear to a minimum and assuring long life. Cables are prevented from twisting, which eliminates undue strain and stresses.

All of these points and many more make possible the low maintenance cost of Niles Cranes.

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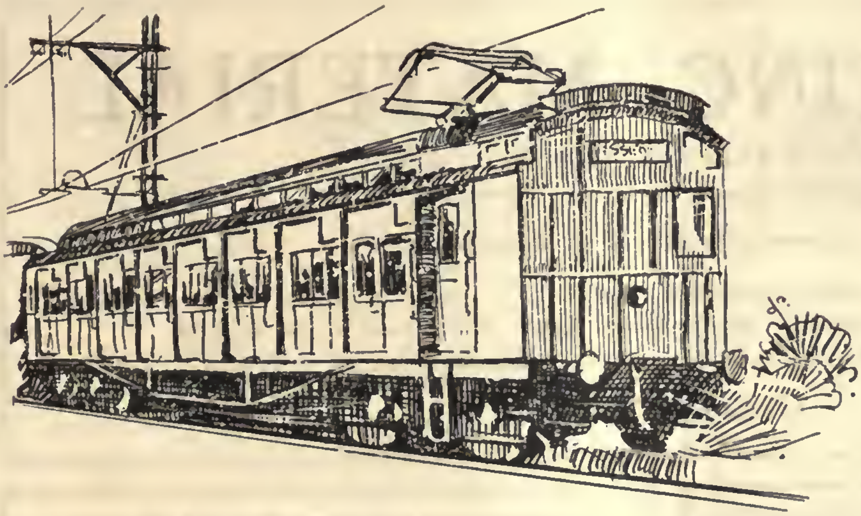

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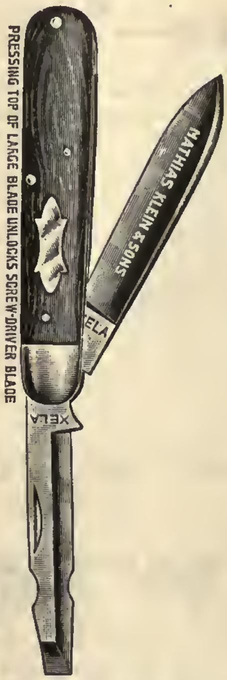
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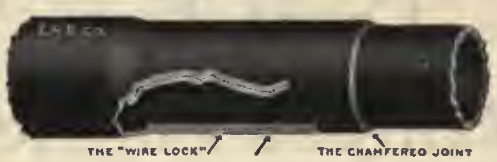

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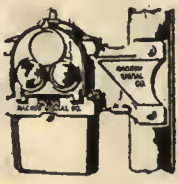

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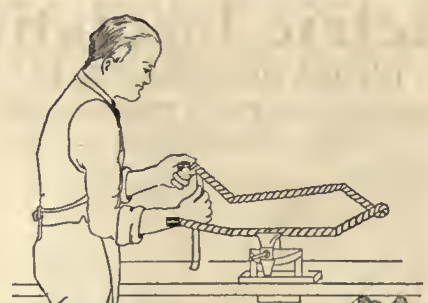

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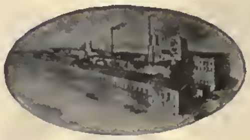

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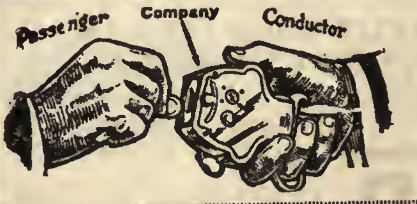

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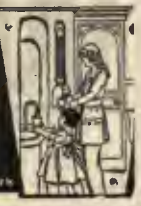

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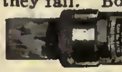
Chicago New York



Bound Brook Trolley Wheel Bushings Give Longer and Better Service

THERE are more Bound Brook (Oil-less) Trolley Wheel Bushings in use today than all other makes combined. That is because Bound Brook Bushings, by virtue of their construction, invariably outlast all other types.

All Genuine Graphited Oil-less Bushings have always been made at Bound Brook, U. S. A.

BOUND BROOK OIL-LESS BEARING COMPANY
Bound Brook, New Jersey *Detroit Office: 1723 Ford Bldg.*

FORD TRIBLOC

A Chain Hoist that excels in every feature. It has Planetary Gears, Steel Parts, 3½ to 1 factor of Safety. It's the only Block that carries a five-year guarantee.

FORD CHAIN BLOCK CO.
Second and Diamond Sts., Philadelphia

Brake Shoes

A. E. R. A. Standards

Diamond "S" Steel Back is the Best Type

Standard Patterns for

SAFETY CAR

D-67 for Narrow Treads
D-87 for Wide Treads

American Brake Shoe and Foundry Co.
30 Church Street, New York
332 So. Michigan Ave., Chicago Chattanooga, Tenn.

They are uniform in quality

They talk for themselves

W. J. Jeandron
227 Fulton Street
New York City

Pittsburgh Office:
636 Wabash Building

Canadian Distributors:
Lyman Tube & Supply Co., Ltd.
Montreal and Toronto

ONE-MAN cars require most reliable equipment. They also require the elimination of superfluous weight. The Earll No. 10 Catcher meets all requirements. It is light and strong and handsome—and 100% efficient.

C. I. EARLL, York, Pa.

Smith-Ward

Brake Slack Adjusters

Are Safe

The automatic adjustment afforded by the Smith-Ward Brake Slack Adjuster does something more than save charges for human labor.

The Smith-Ward Brake Slack Adjuster also saves charges for human negligence.

Because of bad light or severe weather conditions a lot of human adjustment of brakeshoe wear is largely perfunctory.

Result: Many an accident due to the fact that the shoes were improperly set, so that the brakes failed to do what the motorman had the right to expect.

Make the excuse, "The brakes failed to work," impossible on your lines.

Smith-Ward Brake Co.
233 Thirty-seventh St., Brooklyn, N. Y.

"Zero"
for
Axle and
Journal
Bearings

AND

"Motor"
for
Armature
Bearings

STANDARD for a THIRD of a CENTURY

The Mileage Babbitt

Post's ZERO and MOTOR metals have been standard for a third of a century in shops where mileage records are attained. Nothing but highest grade of virgin raw materials used.

Write us for details.

E. L. Post & Co., Inc., Sole Mfrs., 50 Cliff St., New York City

Ideal
Trolley Catchers

For Safety Cars

The Trolley Supply Company, Massillon, Ohio

BETTER THAN BABBITT

wears longer—runs cooler—costs less

used by electric railways at home and abroad

AJAX BULL BEARING ALLOY

made from the purest virgin metals to a scientifically correct formula by the AJAX PROCESS which greatly increases endurance and wearing qualities.

THE AJAX METAL COMPANY

Established 1880

Main Office and Works: Philadelphia, Pa.

Exide
BATTERIES

LOAD
REGULATION

The Chloride Accumulator is aiding in the carrying of peaks and fluctuations of load.

Write for information describing this function of the EXIDE.

THE ELECTRIC STORAGE BATTERY CO.

Oldest and largest manufacturers in the world of storage batteries for every purpose

1888 Philadelphia 1921

Branches in 17 Cities

EXIDE BATTERIES OF CANADA, LIMITED
133-157 Dufferin St., Toronto, Canada

The Kalamazoo Trolley Wheels

have always been made of entirely new metal, which accounts for their long life WITHOUT INJURY TO THE WIRE. Do not be misled by statements of large mileage, because a wheel that will run too long will damage the wire. If our catalogue does not show the style you need, write us—the LARGEST EXCLUSIVE TROLLEY WHEEL MAKERS IN THE WORLD.

THE STAR BRASS WORKS
KALAMAZOO, MICH., U. S. A.

B. A. Hegeman, Jr., President; Charles C. Castle, First Vice-President; Harold A. Hegeman, Vice-President and Treasurer; Fred C. J. Dell, Secretary; W. C. Lincoln, Manager Sales and Engineering.

National Railway Appliance Co.

50 East 42nd St., NEW YORK CITY
Hegeman-Castle Corporation, 343 So. Dearborn St., Chicago, Ill.
National Railway Appliance Co., Munsey Bldg., Washington, D. C.
National Railway Appliance Co., Little Bldg., Boston, Mass.

RAILWAY SUPPLIES

Tool Steel Gears and Pinions, Anderson Slack Adjusters, Genesco Paint Oils, Dunham Hopper Door Device, Feasible Drop Brake Staffs, Anglo-American Varnishes, Paints, Enamels, Surfaces, Shop Cleaner, Johnson Fare Boxes, Drew Line Material and Railway Specialties, Perry Side Bearings, Miller Trolley Shoes, Hartman Centering Center Plates, Economy Power Saving Meters, H. and W. Electric Heaters, Garland Ventilators, Pitt Sanders, National Safety Car Equipment Co.'s One-Man Safety Cars, Flaxlinum Insulation.

ELECTRIC RAILWAY JOURNAL

Think "SEARCHLIGHT" First

ADVERTISING RATES

POSITIONS VACANT—Business Opportunities and other undisplayed ads, 8 cents a word, minimum $2.00 an insertion.

POSITIONS WANTED—Evening work wanted, tutoring and other undisplayed ads of individuals looking for employment, 4 cents a word, minimum 75 cents, payable in advance.

ADD 5 WORDS for box number in undisplayed ads if replies are to any of our offices. There is no extra charge for forwarding replies.

DISCOUNT OF 10% if one payment is made in advance for 4 consecutive insertions of undisplayed ad.

ADS IN DISPLAY TYPE—Space is sold by the inch (30 in. to a page), the price depending upon total space used within a year, some space to be used each issue.

RATE PER INCH for ads in display space:

1 to 3 in., $4.50 an in.	15 to 29 in., $3.90 an in.
4 to 7 in., $4.30 an in.	30 to 49 in., $3.85 an in.
8 to 14 in., $4.10 an in.	50 to 99 in., $3.75 an in.

POSITIONS VACANT

EMPLOYMENT

POSITIONS WANTED

POSITIONS VACANT

GOOD all round car repair man wanted to take charge of shop for road operating eleven cars in city of 30,000, Central Northwest. State experience, references and wages first letter. P-840, Elec. Ry. Journal, Old Colony Bldg., Chicago.

LINEMAN wanted for electrical railway in northwestern Pennsylvania. One who can and will take care of overhead lines and who is willing to do other work if requested. Married man preferred. Address, telling us what you can do and salary expected, Cleveland & Erie Railway Co., Box 43, Girard, Pa.

MECHANICAL and electrical engineer wanted for responsible executive position. Street railway in medium size city. Give salaries earned and full account of experience with other necessary information first letter. P-842, Elec. Ry. Journal, Real Estate Trust Bldg., Phila.

POSITIONS WANTED

EXECUTIVE position by expert operating or transportation man; 16 years' experience in transportation and mechanical departments, city and interurban. Age 40. Will consider any location with future. References A-1. Correspondence solicited. PW-841, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

EXPERIENCED outside construction man desires position in way of electric railway, lighting, underground and submarine cables. Most experience in city of 200,000 population. Can produce results. PW-828, Elec. Ry. Journal, Real Estate Trust Bldg., Phila.

COMPETENT man, experienced on single phase and 1,200 and 600 volt M. U. & locomotive equipment and substations desires to make connections with an up-to-date railway. PW-839, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

POSITION wanted as superintendent of overhead or track or both positions combined. Have had 10 years' successful experience in a similar position. Will furnish very best references. PW-838, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

MISCELLANEOUS

Time-Table and Headway Sheets

Young man studying schedule-making wishes some old time-tables, headway sheets, etc. to analyze. Would also like some practical experience. Would gladly pay postage charges. J. Johnson, 2630 23rd Avenue, San Francisco, Cal.

EVERYTHING FOR TRACK

New and Relaying Rail

FITTINGS AND TOOLS

TRACK SPECIALTIES CO.
29 Broadway, New York City.

New—Used—Rebuilt

MACHINERY AND SUPPLIES

for construction and industrial work

READING ENGINEERING CO., INC.
154 Nassau St., New York

One combination electric weld and copper weld rail

BONDING CAR

Complete with cast weld outfit for 550-600 volts. Bonding car equipped with West. equipment, and is in A1 condition. Sold subject to agreement with Electric Improvement Company. Your best bid solicited.

W. A. LOVEJOY, P. A.
Atlantic Shore Railway, Kennebunk, Maine

For 20 Years

we have been

Buying and Selling

Second-Hand Cars

Trucks and Motors

At Your Service

ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa.

COMPLETE POWER PLANT

FOR SALE

1—500 h.p. Westinghouse Compound Engine, Direct Connected to 550 volt Generator.

2—200 h.p. Harrisburg Engines, Belt Connected to Westinghouse Generators.

1—B & W Boiler, 2 Keeler Boilers, Water Heaters, Pumps, Piping, Switchboards and etc.

All in first class operating condition. Immediate delivery. Make us an offer.

The Lewistown & Reedsville Electric Railway Co., Lewistown, Pa.

WANTED TO BUY

1—Interurban Passenger Motor Car fully equipped.
1—Combination Line and Work Car 40 ft. to 45 ft. long.
3—60,000 lb. Capacity Express Trail Cars.
6—West. H. L. Control Equipments.
20—90 to 100 H.P. Interpole Motors.
1—Westinghouse No. 121—Motor Complete.
1—Gen. Elect. No. 205B Motor Complete.

HENRY C. PAUL, *Receiver*
FT. WAYNE, VAN WERT & LIMA TRAC. CO.
331 PEARL ST., FT. WAYNE, IND.

NEW—80-LB. RAIL and ACCESSORIES

Angle Bars, Spikes, Bolts and Nuts Complete

FOR SALE

A.R.A. "TYPE B" RAIL

Approximately 30,000 gross tons—standard lengths

Stored at Kearney, New Jersey

We buy electric and steam railways that are to be dismantled

HYMAN-MICHAELS COMPANY

NEW AND RELAYING RAILS

Peoples Gas Building, Chicago, Ill.

New York Office:
1324-1326 Woolworth Bldg.

Pittsburgh Office:
1312 First National Bank Bldg.

St. Louis Office:
2115 Railway Exchange Bldg.

TRANSFORMERS

FOR SALE

4—135 kva. General Electric Transformers, Type HS, Form RT, Cycles 60, Cap. 200 kw. 17100/19100/33000Y 370/370/185.

Excellent Shape—Practically New

2—135 kva. General Electric Transformers, Type HS, Form RT, Cycles 60, Cap. 200 kw. 2300/——17100/19100/33000Y.

Union Traction Company
Nashville, Tenn.

FOR SALE—RAILWAY BOOSTER

75 hp. Westgh. 550/600 Volt Direct Current Motor; Form 12, Type S; Direct Coupled to 50 kw. Direct Current Booster, 250/182 Volts; 400/200 Amps, 950 r.p.m.; Set is 2 Bearings; Both machines mounted on same iron base and are practically new.

ARTHUR S. PARTRIDGE
415 Pine St., Saint Louis

FOR SALE—IMMEDIATE SHIPMENT

200 kw. Genl. Electric Belted Railway Generator; 525/575 volts, 348 Amps., 425 rpm.; type MP, class 6-200-425, form H; complete with sliding base, pulley and generator panel; first class condition.

ARTHUR S. PARTRIDGE
415 Pine Street, Saint Louis

An Unusual Opportunity

Large Stock of New Repair Parts Consisting of

G. E. 67 Armature Cores
G. E. 67 Field Coils
G. E. 67 Commutators
G. E. 67 Axle Bearings
G. E. 67 Armature Bearings

Now is the time for you to stock up for emergency at attractive prices. Write, phone or wire for what you need.

Eastern Massachusetts Street Ry. Co.
1 Beacon Street, Boston, Mass.
Address Purchasing Department

SEARCHLIGHT
SERVICE
SECURES
SATISFACTORY
SALES

2004

NEW
REBUILT **ELECTRIC MOTORS** REWINDING
REPAIRING

NEW A.C. MOTORS ½ to 15 H.P.—LARGE STOCK USED MOTORS
EXCELLENT REPAIR SERVICE ON ANY SIZE OR TYPE

CLEVELAND ARMATURE WORKS, INC.

EST. 1895 4732-4-6 ST. CLAIR AVE., CLEVELAND O. *INC. 1918*

MACHINERY IN STOCK FOR IMMEDIATE SHIPMENT

STEAM TURBO GENERATING SETS

1—10,000 kw. (12,500 kva.) Westg. 3 ph., 60 cy., 13200 v., 1800 r.p.m. Turbo Unit with Le Blanc Jet Condenser.
1—1500 kva. Gen. Elec. Curtis 25 cycle turbo unit, 3 ph., 1500 r.p.m., 370 volts, 175 lb. steam pressure.
1—1500 kw. 1875 kva. Allis Chal. horiz. turbo 3 ph. 60 cy. 2300 v. 3600 r.p.m. condensing.
1—1000 kw. 1250 kva. Gen. Elec. horiz. turbo 3 ph. 60 cy. 2300 v. 3600 r.p.m. condensing.
1—1000 kw. G. E. horiz. turbo, 3 ph. 60 cy. 480 vs. 3600 r.p.m. for non-condensing duty. BRAND NEW.
1—500 kw. 625 kva. Gen. Elec. horiz. turbo 3 ph. 60 cy. 2300 v. 3600 r.p.m. condensing.
1—400 kw. Westg., 3 ph., 60 cy., 2200 v., 3600 r.p.m. turbo unit.

FREQUENCY CHANGER SETS

1—500 kw., G. E., 3 ph., 60 cy., 2300 v., 750 r.p.m. generator dir. ctd. to 700 hp., 3 ph., 25 cy., 13200 v., 750 r.p.m. motor.
1—500 kw., G.E., 3 ph., 60 cy., 4150 v., 300 r.p.m. generator dir. ctd. to 800 hp., 3 ph., 25 cy., 8000 v., 300 r.p.m. motor.

MOTOR GENERATOR SETS

1—1000 kw., Westg., 125/250 v., 204 r.p.m. generator dir. ctd. to 1400 hp., 3 ph., 60 cy., 6600/4000 v., 204 r.p.m. motor.
1—200 kw., G. E., 250 v., 900 r.p.m. generator dir. ctd. to 300 hp., 3 ph., 60 cy., 2400 v., 900 r.p.m. motor.
2—100 kw., Westg., 6 pole, 600 v., gen., each dir. ctd. to 150 hp., 3 ph., 25 cy. motor. These are self contained units on cast iron sub-bases.

ROTARY CONVERTERS

1—500 kw., Westg., rotary, 6 ph., 25 cy., 440 v., A.C., 600 v., D.C., 600 r.p.m.
1—500 kw., Gen. Elec., rotary, 600 volt, 60 cy., 1200 r.p.m.
2—300 kw., Westg., 5 ph., 60 cy., 370 v., A.C., 600 v., D.C., 600 r.p.m.
2—200 kw., G. E., 25 cy., 370 v., A.C., 600 v., D.C., 750 r.p.m.
1—150 kw., Westg., 3 ph., 60 cy., 370 v., A.C., 575 v., D.C., 720 r.p.m.
3—150 kw., Gen. Elec., 25 cy., 370 v., A.C., 600 v., D.C., 750 r.p.m.

TRANSFORMERS—25 CY.

6—500 kva., G. E., 13200 prim., 480 secy.
3—200 kva., Westg., 16500 v., prim., 460 secy.
3—200 kw., G. E., 6450 v., prim., 170 secy.
3—185 kva., G. E., 2300 v., prim., 430 secy.
3—150 kw., G. E., 6000 v., prim., 83 secy.
3—125 kw., Westg., 2200 v., prim., 220 secy.
2—75 kva., G. E., 13800 v., prim., 115/230 secy.
3—50 kva., G. E., 13800 v., prim., 115/230 secy.

TRANSFORMERS—60 CY.

1—7500 kva., Westg., 44000/22000-13500 vs.
3—2000 kva., G. E., 66000 v., prim., 6600-13200/22000 v., Y secy.
3—2000 kva., G. E., 60000-2300/4000 Y vs.
2—1250 kva., 3 ph., G. E., 26400/13200 prim., 2400/2200 v., secy.
4—750 kw., G. E., 44000/43000/42000 prim., 6600 secy.
6—600 kva., G. E., 33000/13200 volts.
3—400 kva., Allis-Chalmers, 6600-440 vs.
3—200 kva., G. E., 2200 prim., 370 secy.
3—150 kva., G. E., 6600-120/240 volts.
4—150 kw., Allis-Chalmers, 33000 v., prim., 2300 secy.
6—110 kw., G. E., 14600-13050 v., prim., 430-286-143 v., secy.
3—100 kw., G. E., 9200 v., prim., 2300 secy.
2—100 kw., G. E., 6600/5740 prim., 2760/2400 secy.
3—100 kw., G. E., 6600 v., prim., 605/504 secy.
3—100 kva., Westg., 11000-600 volts.
3—100 kw., Westg., 440 v., prim., 220 secy.
3—75 kva., G. E., 11000/9000-6600 vs.
3—75 kva., G. E., 2300 v., prim., 270 secy.
3—75 kva., Allis-Chal., 6600 v., prim., 440 secy.
3—55 kw., G. E., 2300/2070-270/236/185 vs.
3—50 kva., Westg., 6600/6300/6000 v., prim., 440/220 secy.
3—50 kw., Westg., 5000/6600 v., prim., 1000/1100/2000/2300 v., secy.

ARCHER & BALDWIN, Inc.

Telephone 4337-4338 Rector

114-118 Liberty Street, New York City

SEARCHLIGHT SERVICE

Covers the advertising of

Agencies Wanted
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Educational
Employment Agencies
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Foreign Business
For Exchange
For Rent
Franchises
Industrial Sites
Labor Bureaus
Machine Shops
Machinery Wanted
New Industries Wanted
Partners Wanted
Patent Attorneys
Patents for Sale
Plants for Sale
Positions Vacant
Positions Wanted
Property for Sale
Proposals
Receivers' Sales
Representatives Wanted
Salesmen Want Connections
Salesmen Wanted
Second Hand Equipment
  For Sale   For Rent
  Exchange   Wanted
Specialties
Tutoring
Vacation Work Wanted
Water Front Property
Work Wanted
Miscellaneous for Sale
  for Rent or Want Ads.

Can we serve you?

0150

FOR SALE

ONE STREET SPRINKLER

Length over bumpers—27 ft. 9 in.
Capacity, 4500 gallons.
Trucks, Brill 27 G. I., 14 ft. Wheel Base, 33 in.—450 lb. Chilled Wheels, 4½ in. Axle, 69 tooth gear, 17 tooth pinion.
Motors, 4 General Electric 80's.
Controllers, 2 General Electric K-28, double end operation.
Brakes, Hand and Air, C. P. 27 Air Compressor.
Complete, ready for service, in good operating condition.

FARE REGISTERS

100—International Type R-5, with B-3 back, in first class condition.

ONE STREET SPRINKLER

Length over bumpers, 19 ft.
Capacity, 2800 gallons.
Trucks, single, 21-G, 8 ft. 6 in. wheel base, 33 in., 450 lb. Chilled Wheels, 4½ in. Axle, 69 tooth gear, 17 tooth pinion.
Motors, 2 General Electric 70.
Controllers, 2 General Electric K-11 double end operation.
Brakes, Magnetic and Hand Brakes.
In good condition, ready for service.

RAILWAY MOTORS

6—General Electric 66, form B, 75 solid tooth gear, bore 5.74 in., 19 tooth pinion, complete with cast steel gear cases, 5¾ in. axles, A-1 operating condition.

Very low prices to move above equipment quickly.

GRAND RAPIDS RAILWAY COMPANY

Grand Rapids, Michigan

SOME ONE WANTS TO BUY

the equipment or machinery that you are not using. This may be occupying valuable space, collecting dust, rust and hard knocks in your shops and yards.

SELL IT BEFORE DEPRECIATION SCRAPS IT

THE SEARCHLIGHT SECTION IS HELPING OTHERS
—*LET IT HELP YOU ALSO*

0079

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Air Aftercoolers
Ingersoll-Rand Co.

Air Receivers
Ingersoll-Rand Co.
Western Elec. Co.

Anchors, Guy
Crouse-Hinds Co.
Electric Service Supplies Co.
Ohio Brass Co.
Western Elec. Co.
Westinghouse Elec. & Mfg. Co.

Angle Bars
Lackawanna Steel Co.

Automobiles and Buses
Brill Co., The J. G.

Axles
Cambria Steel Co.
Bemis Car Truck Co.
Midvale Steel & Ordnance Co.

Axle Straighteners
Columbia M. W. & M. I. Co.

Axles, Car Wheel
Bemis Car Truck Co.
Brill Co., The J. G.
Standard Steel Works Co.
Westinghouse Elec. & Mfg. Co.

Babbitt Metal
Ajax Metal Co.
More-Jones Brass & Metal Co.

Babbitting Devices
Columbia M. W. & M. I. Co.
Western Elec. Co.

Badges and Buttons
American Railway Supply Co.
Electric Service Supplies Co.
International Register Co., The
Western Elec. Co.

Batteries, Dry
Nichols Lintern Co.
Western Elec. Co.

Batteries, Storage
Electric Storage Battery Co.

Bearings and Bearing Metals
Ajax Metal Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
More-Jones Brass & Metal Co.
Post & Co., Inc., E. L.
Westinghouse Elec. & Mfg. Co.

Bearings, Center and Roller Side
Stucki Co., A.

Bearings, Roller and Ball
Railway Roller Bearing Co.

Bells and Gongs
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Western Elec. Co.

Benders, Rail
Niles-Bement-Pond Co.

Boilers
Babcock & Wilcox Co.

Boiler Tubes
National Tube Co.

Bond Testers
American Steel & Wire Co.
Rail Welding & Bonding Co.

Bonding Apparatus
American Steel & Wire Co.
Electric Service Supplies Co.
Ohio Brass Co.
Rail Welding & Bonding Co.

Bonds, Rail
American Steel & Wire Co.
Copper Clad Steel Co.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Rail Welding & Bonding Co.
Westinghouse Elec. & Mfg. Co.

Book Publishers
McGraw-Hill Book Co., Inc.

Boring Tools, Car Wheel
Niles-Bement-Pond Co.

Bores—Junction and Outlet
National Metal Molding Co.

Brackets and Cross Arms (See also Poles, Ties, Posts, Etc.)
American Bridge Co.
Bates Expanded Steel Truss Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.
Western Elec. Co.

Brake Adjusters
Gould Coupler Co.
National Ry. Appliance Co.
Smith-Ward Brake Co.
Westinghouse Traction Brake Co.

Brake Shoes
Amer. Brake Shoe & Fdry. Co.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.

Brakes, Brake Systems and Brake Parts
Allis-Chalmers Mfg. Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
National Brake Co.
Safety Car Devices Co.
Westinghouse Traction Brake Co.
Western Elec. Co.

Bridges and Buildings
Amer. Bridge Co.

Brooms, Track, Steel or Rattan
Paxson Co., J. W.
Western Elec. Co.
Zelnicker, W. A., Supply Co., Inc.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Morganite Brush Co.
United States Graphite Co.
Westinghouse Elec. & Mfg. Co.

Brushes, Graphite
United States Graphite Co.

Brush Holders
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.

Bunkers, Coal
Amer. Bridge Co.

Bushings, Case Hardened and Manganese
Bemis Car Truck Co.
Brill Co., J. G.
National Metal Molding Co.

Bushings, Graphite and Wooden
Bound Brook Oilless Bearing Co.

Cables. (See Wires and Cables)

Cambric Tapes, Yellow and Black Varnished
Irvington Varnish & Insulator Co.

Cambric, Yellow and Black Varnished
Irvington Varnish & Insulator Co.

Carbon Brushes. (See Brushes, Carbon)

Car Heaters
Economy Electric Devices Co.

Car Panel Safety Switches
Westinghouse Elec. & Mfg. Co.

Cars, Dump
Differential Car Co.

Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
Cambria Steel Co.
Kuhlman Car Co., G. C.
McGuire-Cummings Mfg. Co.
Midvale Steel & Ordnance Co.
National Ry. Appliance Co.
Wason Mfg. Co.

Cars, Second Hand
Electric Equipment Co.

Cars, Self-Propelled
Electric Storage Battery Co.
General Electric Co.

Castings, Brass, Composition or Copper
Ajax Metal Co.
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.
More-Jones Brass & Metal Co.

Castings, Gray Iron and Steel
American Bridge Co.
American Steel Foundries
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Standard Steel Works Co.

Castings, Malleable and Brass
Amer. Brake Shoe & Fdry. Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.

Catchers and Retrievers, Trolley
Earll, Chas. I.
Electric Service Supplies Co.
Ohio Brass Co.
Trolley Supply Co.
Wood Co., Chas. N.

Ceiling, Car
Keyes Products Co.
Pantasote Co.
Rail Welding & Bonding Co.

Change Carriers
Galef, J. L.

Checks, Employees
American Railway Supply Co.

Circuit Breakers
Cutter Elec. Mfg. Co.
General Electric Co.
Western Elec. Co.
Westinghouse Elec. & Mfg. Co.

Clamps and Connectors for Wires and Cables
Anderson Mfg. Co., A. & J. M.
Dossert & Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Eureka Co.
General Electric Co.
Hubbard & Co.
Klein & Sons, Mathias
Ohio Brass Co.
Western Elec. Co.
Westinghouse Elec. & Mfg. Co.

Cleaners and Scrapers—Track (See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
Ohio Brass Co.

Cleats
National Metal Molding Co.
Western Elec. Co.

Clusters and Sockets
General Electric Co.

Coal and Ash Handling. (See Conveying and Hoisting Machinery)

Coil Banding and Winding Machines
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

Coils, Armature and Field
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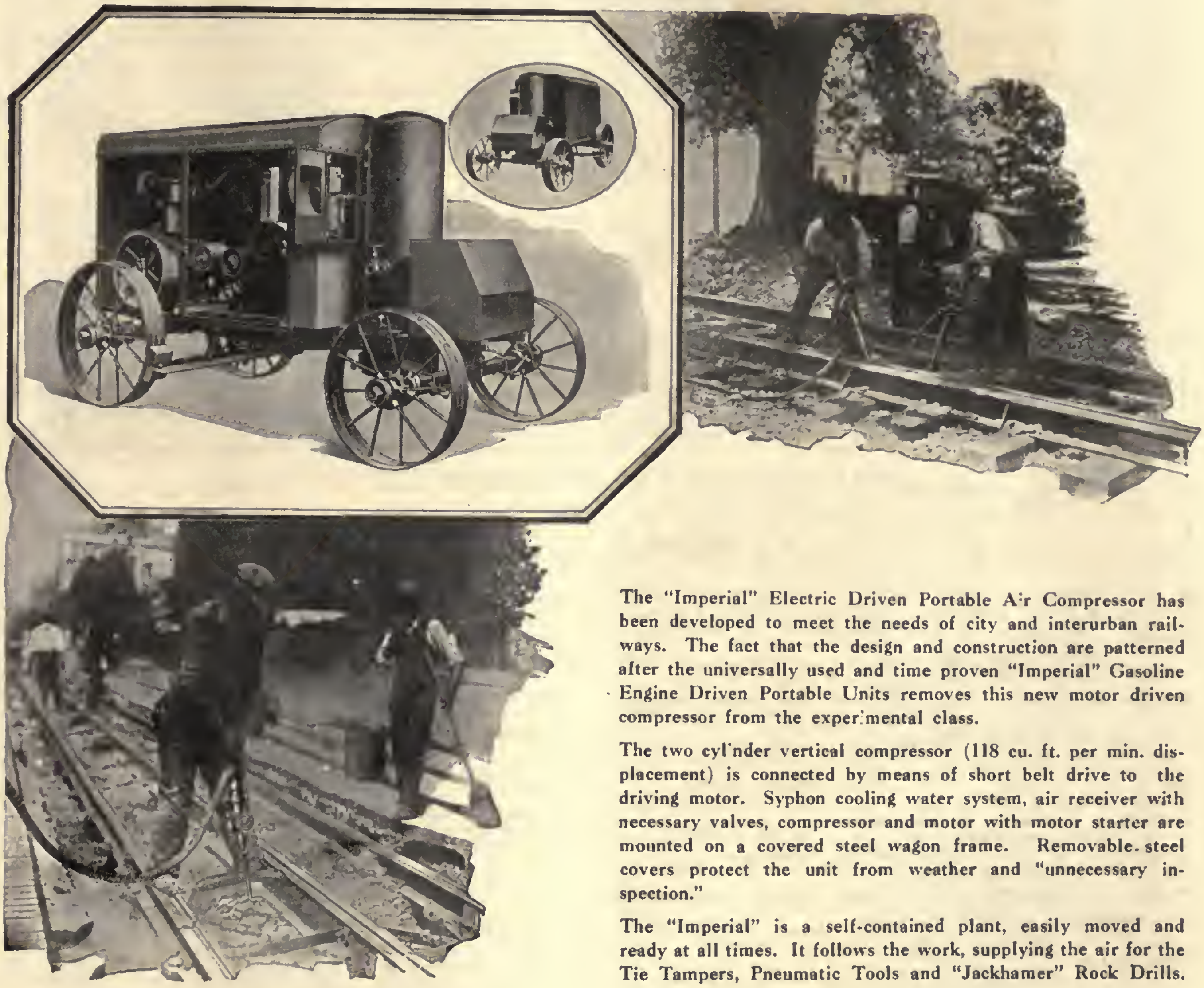

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Felling the Western red cedar in the woods of the great Pacific Slope.

Peeling, scaling and inspecting Western red cedar poles in woods, Washington.

Manufacturing the cedar pole.

Poles awaiting cars for shipment to concentration yards.

Barrett
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Liquid Creosote Oil
For Preserving Wood

A Pole Story—

THESE original photographs show the whole production of cedar poles.

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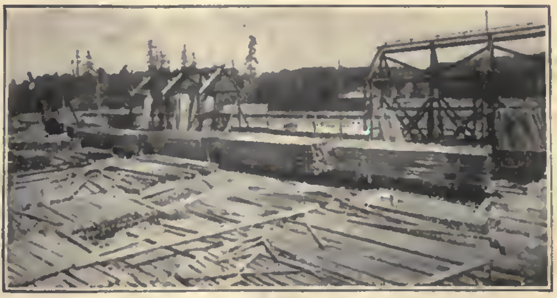
Western red cedar poles, 100 ft. long, awaiting unloading at Everett, Wash.

S. S. William Chatham ready to cast off at Everett with largest cargo of poles ever exported from U. S.

Poles piled for seasoning in concentration yard.

Trainload of butt-treated Western red cedar poles leaving treating plant.

Shaving ground line area of poles.


Commercial Open Tank process cedar pole creosoting plants.

Brush-treating pole. Note use of a mop.

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Automatic Means Economic

The first automatic railway substation in America was installed on the Elgin (Ill.) and Belvidere Electric Railway six years ago. It was G-E equipped.

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Today there are 12 G-E automatic substations in operation on the Des Moines City Railway lines.

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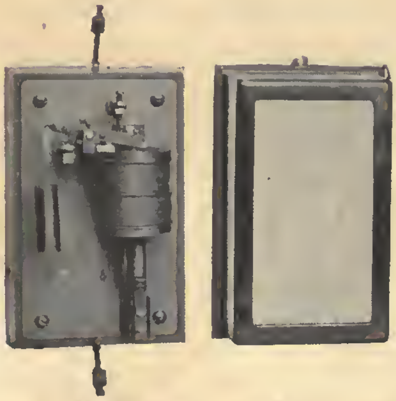

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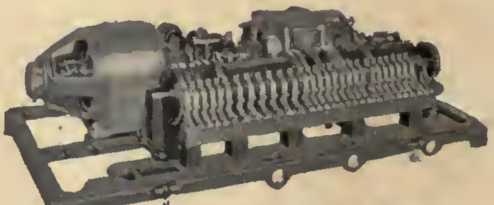

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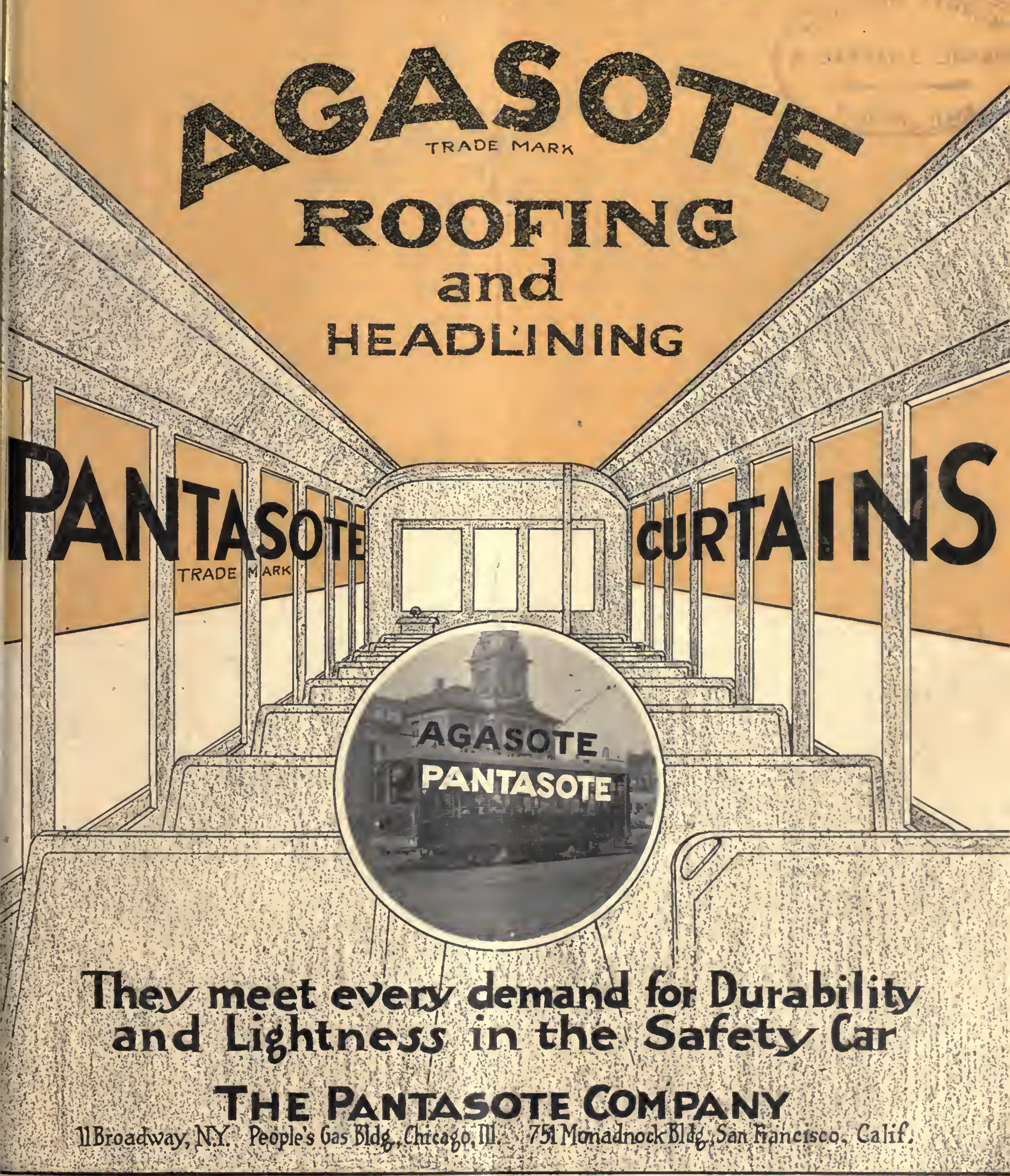
ELECTRIC RAILWAY JOURNAL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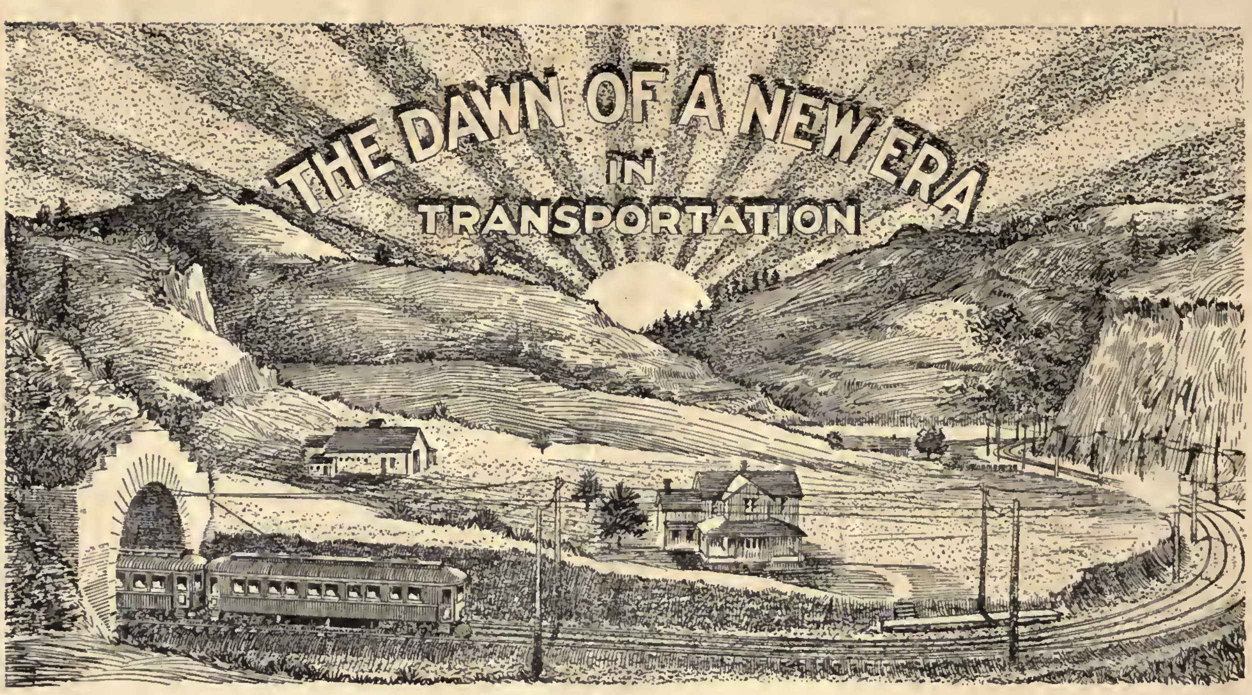

WHILE emerging from the present financial and industrial dilemma, there are extremely bright prospects in store for the electric railways of the country. Marked economy in operation is obtainable by replacing obsolete or worn out motors and control. All operating requirements can be met with strictly up-to-the-minute Westinghouse standard motors and refined HL control.

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Westinghouse

Vol. 57, *No.* 9 New York, February 26, 1921 *Pages* 391-430

Electric Railway Journal

HENRY W. BLAKE and HAROLD V. BOZELL, Editors HENRY H. NORRIS, Managing-Editor

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Clean one-half of the condenser while the other half continues to maintain vacuum on the turbine.

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East Pittsburgh, Pa.

The
Divided Water Box
provides
additional operating
refinements

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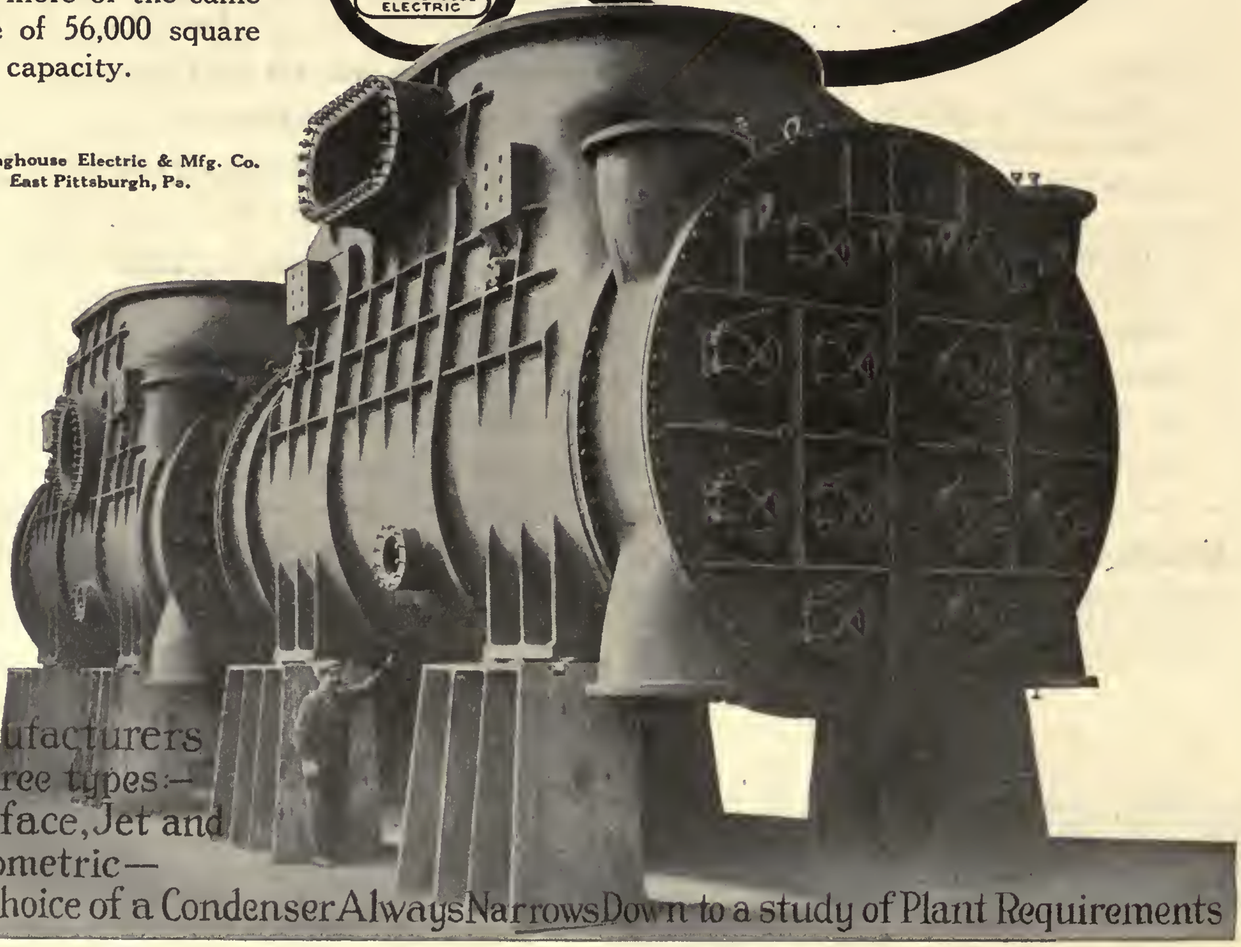

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of three types:—
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Barometric—
The Choice of a Condenser Always Narrows Down to a study of Plant Requirements

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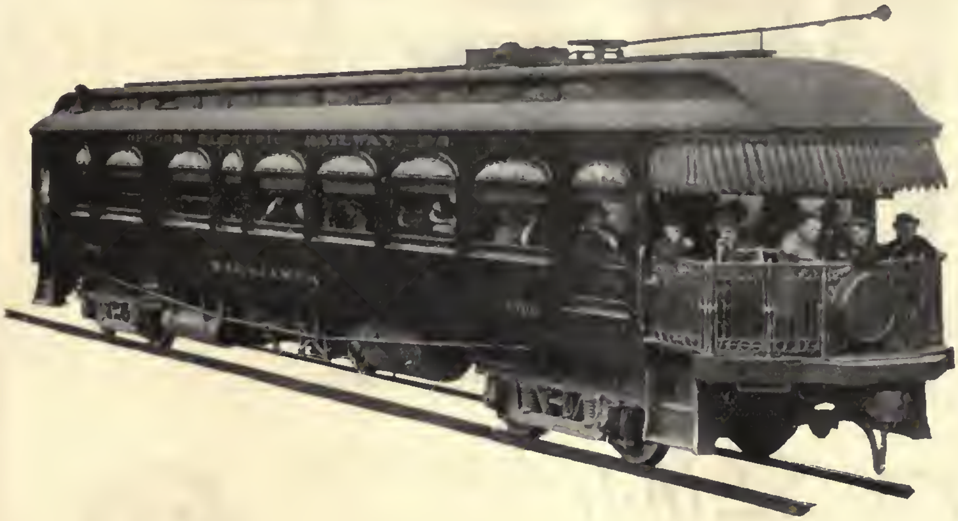

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SCHEDULE FOR
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Straight Air Brake with Emergency Feature for single motor cars, or two-car (motor and trailer) train in city and suburban service where moderate speeds prevail.

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"One man cars advocated for surface lines" is the heading of an article which appeared recently in one of the large metropolitan dailies.

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The Safety Car Devices Co. Air Brake and Safety Car Control Equipment makes *every* Safety Car *Safe*.

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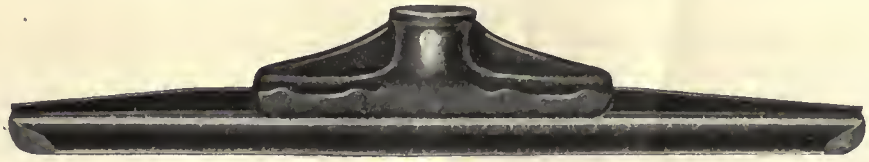

O-B Extruded Ear (patented) has an extruded brass runner piece on which is clinched and riveted a sherardized malleable iron boss. The boss threads are packed with grease at the factory.

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Six years ago—in February 1915—an electric railway in Pennsylvania started a test on O-B Extruded Ears. A curve was selected over which 325 cars pass every day.

O-B Extruded Ears and cast trolley ears were alternated.

December 1917 saw the removal of the cast ears—2 years 10 months of service. That's pretty good life.

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Try the "Stagger" test for yourself. Alternate O-B Extruded Ears with cast ears and watch them.

On Round wire

On Figure 8 wire

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Cross Sections of O-B Extruded Ears Installed.

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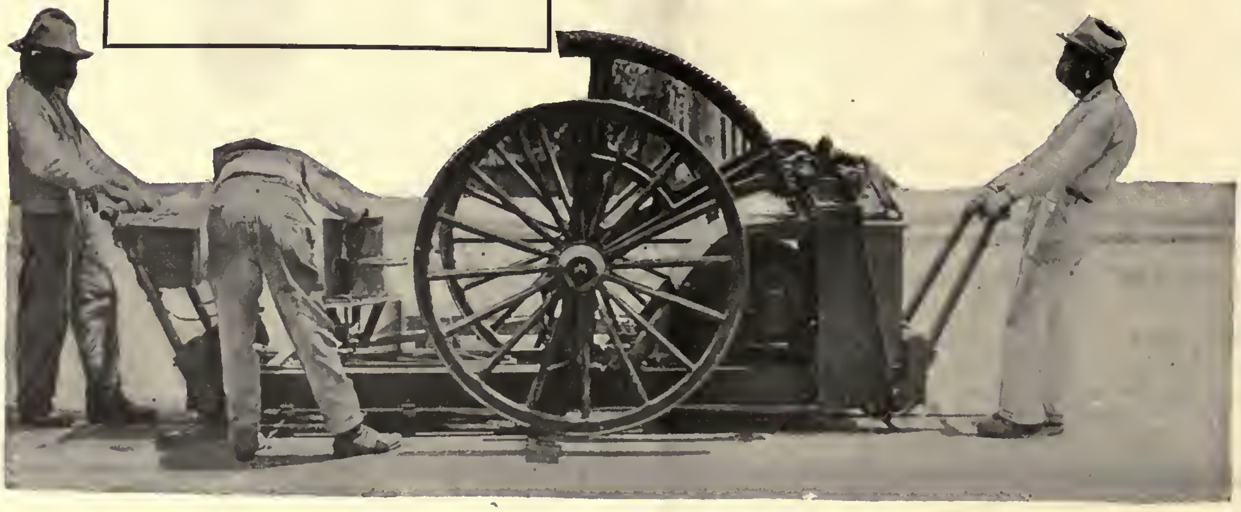

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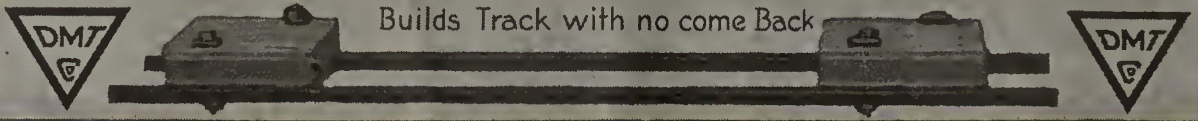
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Signs, headlights, catchers, sanders, car signal systems, gongs and gear cases — all equipment which is of utmost importance in the building of a safety car.

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Women Workers Will Appreciate Your Action

Standardize! Pneumatize!

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Here comes in one of the auxiliary advantages of National Pneumatic Door and Step Control for the less the car operator uses his hands for door and signal operation, the more he can use them for assisting the women rider to get aboard or leave without tripping over an entangled skirt or a pinched cloak.

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Improve the service of your property. That's a sure way to increase business volume. But above all, keep an accurate check on the number of fares collected, because that's what *determines gross revenue*.

The best way to insure maximum fare collection is by the installation of Johnson Fare Boxes and Metal Tickets. This combination is now being used by hundreds of the country's leading Electric Railways. The Johnson System makes it possible to get practically all of the fares that were formerly lost through inefficient methods of fare collection.

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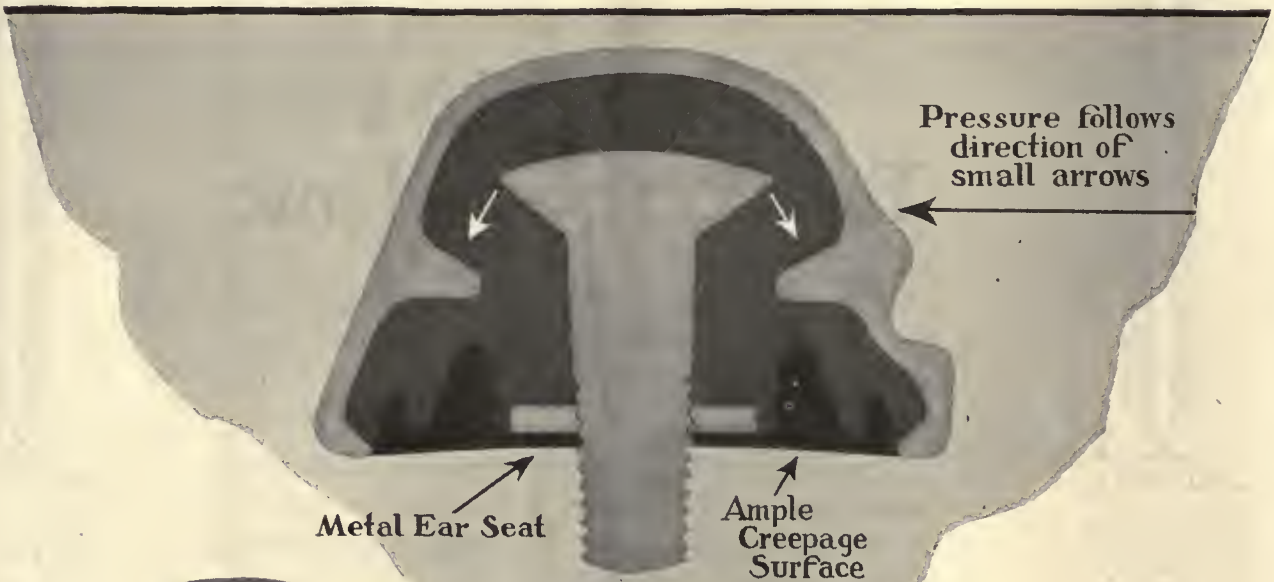
Durability is not alone a matter of quality of materials—details of construction have an even greater effect upon the life of a product.



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Form H Hangers are built for long life — note the shape of the metal shell as shown in the cross section drawing above. The strain of supporting the trolley wire does not fall on unsupported moulded insulation; sturdy metal projections on the inside of the shell reinforce the compound making the strain one of compression — the bolt cannot pull out in service.

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Electric Railway Journal

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Volume 57 New York, Saturday, February 26, 1921 *Number* 9

Electrical Engineers Are Conservative Regarding Cable Rating

THE American Institute of Electrical Engineers took up a vital subject at the midwinter convention last week in New York, when careful consideration was given to the possibility of marking up the safe carrying capacity of electric power cables. The present Institute standard rule, which is of course the basis upon which cables are purchased, rates them upon an ultimate temperature of 85 deg. C. under steady load. This some engineers consider ultra-conservative, but the consensus of opinion at the New York meeting favored the 85-deg. rating, leaving to the owners of the cables the responsibility for results if the standard rating is exceeded. This can safely be done under some conditions and for certain periods, but the standard rule might well remain as it is for the present.

A question of a few degrees more or less may not seem very important to one not responsible for cable manufacture or operation. As a matter of fact, it is fundamentally important, on account of the nature of the materials which are involved. The discussion at New York related to paper cables, but of course the same general considerations apply with rubber-insulated cables. In cables, organic materials are necessarily depended upon for insulation, and such materials are extremely sensitive to the effects of high temperature. The changes which are produced are very subtle and, as inspection of the insulating material is possible only by destruction of the cable, a large factor of safety in loading must be allowed.

Entirely aside from the result of the conference of the Institute on the rating of cables, the information brought out will have great current and reference value to cable owners among electric railways. It will give a sense of security to all of those who have treated their cables with due consideration of their temperature-life characteristics.

The Motor Bus Advances Again

ANOTHER breach in the "greater capacity" fortress of the electric railway is threatened in the London General Omnibus Company's development of the fifty-four-seat motor bus, described elsewhere in this issue. It is true that the Chicago Motor Bus Company can claim priority in bringing out a bus of this capacity, but the London case is more significant in that the super-bus is to be used over narrow, congested, frequent-stop highways for the greater part of its runs, without Chicago's offset of long stretches through public parks. We are therefore to see whether the schedule speed of such a bus can equal the old-time thirty-four-seater, it being a question of a big bus with good passenger interchange facilities but more stops versus a small bus with one-aisle entrance and exit. It is true that the company has had in use for a year or so about two hundred Type K, forty-six-seaters, which also have the spacious platforms of the latest type, but the fifty-four-seater will prove a far harder test.

The significant fact as to efficient use of space is that within a length of 24 ft. 7 in. over all it is possible to carry fifty-four seats, whereas three years ago a length of 22 ft. 6½ in. was required for but thirty-four seats. Expressed in linear dimension of street space, the drop has been from 8 in. to 3.46 in. per seated passenger, and in terms of area (passengers into the product of maximum over all dimensions of width and length) from 4.68 sq.ft. to 3.22 sq.ft. per passenger. Next in importance is the matter of weight, for through the use of such metal as nickel steel for the body framing the weight per seated passenger has been cut from 237 lb. to 173.5 lb.

It is pleasant to add that the two large American double-deck bus operators are also well up in front in both capacity and weight developments. Thus the standard forty-seven-seat bus of the Fifth Avenue Coach Company weighs 190 to 200 lb. per seat, and the new sixty-seat double-deck bus of the Chicago Motor Bus Company was figured to weigh but 209 lb. per seat, despite the inclosure of the top deck. These attainments give rise to the hope that future single-deck buses, which will probably be the most common in the United States, will also embody the use of high-strength materials, for low weight is an urgent necessity in view of the high cost of gasoline.

California's Help Sought in New York Traction Affairs

THE transit situation in New York City and New York State has received a national aspect by the appointment of Senator Hiram W. Johnson of California as special traffic counsel for New York City in opposition to the Miller plan. If Senator Johnson, who has a large popular following in his state, will bring constructive ideas to the New York City problem, his advent is to be welcomed. Criticisms have been directed against his appointment because he comes from far away, but this, of itself, ought not to debar him.

Incidentally, Senator Johnson, while Governor of California, is credited with having been largely responsible for the passage of the California public utilities act in 1911, by which the commission was changed from an elective commission to one appointed by the Governor. By this act the jurisdiction of the commission was extended to include rates, service, finances, facilities and extension of the State's public utilities. In its report for the year ended June 30, 1920, just issued, the California Commission has this to say among other things in regard to the railways within its jurisdiction:

> The interurban and street railways have suffered more, perhaps, than any other class of utilities from the conditions brought about by steadily rising costs during the last few years. With street railway fares fixed at 5 cents, by custom and by franchises, the shrinking value of the dollar threatened disastrous consequences for practically all street railways. And yet it is apparent that, in spite of the more

severe competition of motor vehicles, the time is by no means here when our cities and rural territories can dispense with electric railway facilities. . . .

The commission has not hesitated to extend to the electric railway systems of the state such relief, by increase of fares or by establishment of the zone system, or by ordering radical operating economies, as would insure a continuation of reasonably good service.

The commission has also taken opportunity to call attention to its belief that the relationship between street railways and the communities they serve should be radically changed and that a modification of obsolete franchise requirements would distinctly be in the interest of the public. . . . The change from unsatisfactory and obsolete term franchises to better indeterminate franchises is now being effected in several communities and is being given careful consideration in others. The commission, under the public utilities act, is called upon to take a part in the creation of better franchise conditions and several proceedings of this nature are now pending.

This plan for California does not seem to differ very greatly from that which Governor Miller proposes for New York City.

The Bus as a Tax Reducer

IT'S all very well to appeal to the other fellow's sense of justice, but there are times when a more convincing argument is needed. A good example of this is the time-disgraced practice of making the car rider pay for the bridges and the street paving used, while no payment other than a nominal license charge is required by every class of private business and pleasure vehicle. The arguments of the railway company as to the unfairness of these charges are generally admitted, but the taxes continue just the same because the temptation to pluck a victim who can't get away is too great to be resisted.

Conditions have changed now, however, and today there are many places where the victim can get away from these extortionate contributions by threatening to substitute a motor-bus service for the trackway. At once the community will become alarmed at the prospect of having its ever-on-the-job transportation service replaced by something that can be withdrawn instanter to more lucrative fields. It will begin to inquire more deeply into the matter and, rather than sacrifice so tangible and comfortable a service as that on rails, seek to retain it by offering to remit the objectionable and unreasonable imposts of the past.

Such a plan is practicable, of course, only when the cost of bus operation per seat is no more than that of car operation plus the paving or bridge charge, but this is often the case on lines of light traffic, and where the line is a poorly paying one or is not paying at all the change is better than to discontinue service altogether. Moreover, the effect on the community of such a change ought to be most salutary. Having admitted the injustice of such a charge where payment can be avoided, the authorities cannot well continue to impose it on routes which are bound to remain trackways.

Of course, it does not follow that the bus will not have to pay for the use of the highway, but as, unlike the car, it does not differ essentially from other vehicles, it is not conceivable that it will ever be singled out for such disproportionate burdens as has been the case since the first legislative Solon wrote that awful clause: "And the tramway shall be responsible for the installation and maintenance of the paving between the rails and for 18 in. on each side thereof," not to mention curb-to-curb paving, street sprinkling or other taxes once so cheerfully drawn out of the street railway's cornucopia!

More Science and Less Law

AN ENGINEER on a hard-pressed electric railway property recently expressed his disappointment at the expenditure by his company of a large sum of money for counsel to fight a certain measure demanded by the authorities and thought unreasonable by the company. "From an engineering standpoint," he said, "the change would have little value, but it could have been made for but little if any more than the sum expended for legal charges to find a way not to comply." The remark offers food for thought. Many public demands are incapable of fulfillment except at prohibitive cost, but there are others nearer the border line of reasonableness and practicability as regards expense where a straining to do what the public wants would be good policy.

Selling Energy to the Farmers

PEDDLING electric service to the farmers seems at first glance to be a little out of place for a company which is supposed to make its bread and butter by transporting commodities of a little more tangible character than electric energy. The old proverb that one who is "a jack of all trades is master of none" is probably quite as true today as it was when the world was a little younger. Nevertheless, many electric railways do other things than sell and deliver transportation service, and in the great interurban country of the Middle West selling electric energy is one of these.

To the old timers in the industry the problem is not a new one. The interurban railways were the pioneer builders of cross-country power lines, and in the very beginning and at intermittent intervals ever since they have been pestered by well-meaning farmers and small-town officials who have desired electric service. These people in their excusable ignorance did not know, and for that matter do not now know, that electric service, like a mule, may have various standards of quality and character and that the particular brand of these useful characteristics afforded by a 600-volt trolley circuit is not well adapted to domestic entanglements. In some instances kindly disposed officials permitted connections to the trolley circuit or to substation buses. The general practice, however, has been either to wholesale energy from the transmission line or do both a wholesale and a retail business through the medium of a subsidiary company.

The recent widespread demand on the part of farmers and residents of outlying villages for electric service seems to be bringing in a whole crop of disturbing questions. Among these may be mentioned the problems of ownership of lines, construction details, financing, methods of operation and maintenance, damage liability and rates. The subject of rates is likely to receive sufficient attention because of its obviousness, but the problems of construction and operating and maintenance methods may be quite as important to the railway from the standpoint of its main business. Rural distribution lines erected, operated and maintained by farmers' mutual associations or stock corporations are likely to prove a distinct menace to the continuity of railway power supply when connected to railway transmission lines unless the railways take an active interest in seeing that these lines are properly built and maintained. And then there is the matter of damage liability. Unless responsibility for this liability is properly fixed, a single accident may cause the railway the loss of valuable good will as well as a monetary loss which the sale of energy for a good many years would not cover. With these problems properly solved, however, the rural power field seems to have large future possibilities. Certainly it is worthy of careful consideration by those electric railways which are now carrying on an electricity supply business.

Why Not "An American Committee on Electrification"?

SO MANY organizations are becoming interested in the subject of electrification of steam railroads that already there is much duplication of effort in gathering, digesting and presenting information in this highly important field. Electrification affects so many interests that it is perfectly proper for the national societies representing these interests to study it from their several points of view. They ought, however, to co-operate in some way so that the results of their work will be cumulative rather than repetitive.

The necessity for co-operation has been for some time in the minds of the men who are active on heavy traction committees in a number of associations. So far they have not been able to do much, except by an attempt at interlocking committee memberships. This prevents duplication somewhat, but its effectiveness is not to be compared with that which could be secured through the functioning of a joint committee, composed possibly of the chairmen of all heavy traction committees in the national societies. This committee could shoulder such duties as the compilation of general electrification data, and it could parcel out among the affiliated special committees the lines of work in which they severally are most interested and can most effectively carry out. There are successful precedents for such a committee in the American Committee on Electrolysis and the American Engineering Standards Committee, not to mention the numerous other joint committees which have less comprehensive scope.

In this connection it is highly important for each organization that is interested in electrification to realize just why it is so interested, and to define the subdivision of the field to which it will devote attention. A joint committee would help in this task. It is easy to see, for example, that the American Railway Association is concerned in this whole matter from the transportation standpoint, while its mechanical section is interested in the maintenance of the electrical equipment and in the design of the electrical rolling-stock. The American Railway Engineering Association looks less at the details of construction of electric locomotives and cars but more at the broader engineering aspects of the problems involved. Then comes the American Electric Railway Engineering Association, which offers the railroads the benefit of the experience of many electric railways with moderately heavy electric locomotives and heavy multiple-unit cars. These and other railway associations are close to the job and are vitally concerned with the success of electrification. There are other groups of associations which are manifesting a lively interest in it also, and the reason is not far to seek.

Take first the engineering associations of a general nature, like the American Institute of Electrical Engineers, the American Society of Mechanical Engineers, the Franklin Institute, etc. To them a change in motive power on the steam roads opens up new and attractive possibilities for applying the principles of engineering science and for standardizing practice as it develops. Then there are the other organizations, like the National Electric Light Association, representing the power industries, which look to the railroads as an enormous field for new business. They naturally want to keep in touch with electrification progress.

All of this simply goes to prove how obvious is the necessity for some kind of clearing house for electrification information. This year there will be some duplication of work and waste of energy; next year there will be more, unless a determined effort is made to prevent it.

Service at Cost Not the Same as Cost Plus

IN SOME communities an opposition to service at cost has arisen under the mistaken notion that in principle it is very much like the cost-plus plan of contracting. This latter plan was subject to so much abuse during the war that it is under somewhat of a cloud, and in certain respects deservedly so. Under the cost-plus plan the profits of the contractor increase with the cost of the undertaking, and consequently he is under the temptation to pad the expenses and increase the cost.

The service-at-cost plan of railway operation is not open to this temptation. No matter how expensive or extensive the service, the recompense of the contractor does not increase. With the incentive form of service at cost the recompense actually diminishes with inefficient operation. With straight service at cost the operating company is on what corresponds to a salary basis, all expenses being under supervision of the city, but in no case do the profits increase with the expenses. In fact, in straight service at cost there are no profits, the arrangement being one of hiring at a fixed rate the equipment and working organization of the railway company. Perhaps it is the novelty of this idea of no profit which makes service at cost difficult for the ordinary business man to understand. It is different. Its nearest parallel, of course, is a city department which is self-supporting, like a department of docks or a water department. In fact, the only notable difference is that private management and capital are substituted for public, to the benefit of the community.

Quotation from the Federal Electric Railways Commission Report No. 9

WHILE eventually it might become expedient for the public to own and operate electric railways, there is nothing in the experience thus far obtained in this country that will justify the assertion that it will result in better or cheaper service than privately operated utilities could afford if properly regulated.

Public ownership and operation of local transportation systems, whether or not it be considered ultimately desirable, is now, because of constitutional and statutory prohibitions of our local governments, and the state of public opinion, practicable in so few instances that private ownership and operation must as a general rule be continued for an extended period.

Commission Studies Newark Traffic

The Engineers of the Board of Public Utility Commissioners of New Jersey Make Thorough Analysis of Street Railway Operation on Broad and Market Streets and Suggest Plans for Extensions and Rerouting—Speed of Cars Found to Be Very Low on Main Thoroughfares

THE traffic inspectors of the New Jersey Board of Public Utility Commissioners have recently completed a comprehensive study of street car traffic on Broad and Market Streets, Newark, and have made suggestions in ways of handling the rush-hour peak traffic. Two of the main streets of Newark are Broad and Market, which cross at right angles approximately in the center of the densest traffic territory, and the present routing of the majority of the cars is on these streets through the center of the city. The traffic situation is further complicated by the extreme number of vehicles which must also use the same arteries followed by the street cars. Congestion and slow movement are perhaps more noticeable on Market Street, and are particularly acute from 4:30 to 6:30 p.m.

The Public Service Railway, to provide for the then steady increase in traffic, built an elaborate terminal in 1915 on Park Place and constructed loops through it so as to reduce the congestion at Broad and Market Streets and Broad and Central Avenue. This, however, was accomplished at the expense of greater congestion at Market and Mulberry Streets.

In 1915 the population of Essex County, of which Newark is a part, was 566,324, while in 1920 it was 652,000, an increase in five years of 86,000, or 15.2 per cent. During this time the Public Service Railway, unfortunately, has not opened up any new routes of importance with the exception of the Port Newark extension, and it has therefore been necessary to care for the increase in traffic during rush hours by the addition of extra service over the established routes. During the war the company adopted the skip-stop plan and thereby increased the available car mileage of existing equipment. This improved the service to some extent even though the company was unable to secure the needed additional equipment properly to care for the increased demands of traffic.

In December, 1917, as the result of a previous investigation of the then existing congestion, the commission's traffic engineers recommended staggered closing hours for department stores and other commercial establishments to spread out the rush-hour traffic. Co-operation with this plan was followed to some extent and for a while resulted in an improvement of the car service. It has not been possible, though, to get the department stores to change their hours of employment so they would not coincide with the general closing hour of other commercial establishments throughout the city. The moving picture theater at present is believed to have much to do with traffic congestion, for the shoppers after making their store purchases often spend considerable time in these places of amusement and are not ready to go home until the rush-hour traffic is really at its peak.

During October and November, 1920, a study was made of the car density on Broad and Market Streets. It was found about 50,000 persons left that city center on street cars during the evening rush hours. To help care for this traffic the company has purchased additional trailers and intends soon to operate them on lines extending through the center of Newark. The operation of these trains, it is said, will result in even greater car density on Broad and Market Streets than at present and will tend further to slow up traffic.

The car density north on Broad Street during the evening rush is shown in the diagram. This shows that the "neck of the bottle" on Broad Street is between Central Avenue and Bridge Street, including the intersection at Central Avenue and Broad Street. The greatest number of car movements in all directions during the two-hour rush at Broad Street and Central Avenue is 525, equivalent to a car every thirteen seconds, which is merely the time required for a car to pass over the intersecting track, for the average headway on the northbound track was thirty seconds, while southbound it was thirty-two seconds. The east and west bound cars at this intersection are those of the Central Avenue line, which operate on an average headway of 3.6 minutes in each direction.

A count made on Oct. 25, 1920, between 4:30 and 6:30 p.m. showed that 242 northbound cars passed the observation point on Broad Street between Central Avenue and Bridge Street. The greatest car density was between 5 and 6 p.m., when a car almost invariably passed every twenty-four seconds, although in some instances there were two cars within the twenty-four-second period. At other times the headway was irregular. Inquiry as to the cause showed this to be due to the time required for loading the cars. Inasmuch as the operators were unable to make up the time lost on the return trip the delays became greater because of the increased car density on Broad Street. As a result of the cars being off schedule the first car appearing would usually be overcrowded.

It also developed that when a car became six or seven minutes late during the evening rush hours it was almost impossible to get it back on schedule before the theater traffic commenced. If the lost time was made up it was by turning back cars before they completed their prescribed route, though this resulted in a portion of the route being without its full quota of service.

On Broad Street the scheduled running time for the cars between Clinton and Bloomfield Avenues, a distance of 1.89 miles, during the evening rush hours is sixteen minutes. The calculated schedule speed per trip is therefore 7.1 m.p.h. Actual observations showed, however, that it was impossible for the car operators to meet this schedule and that, instead, the cars actually developed a speed of but 5 m.p.h., far too low for satisfactory street railway transportation. This meant twenty to twenty-three minutes to make a sixteen-minute run, with the consequent lengthening of headway and unnecessary overcrowding.

As a result of these studies the commission's inspectors concluded that the point of saturation of car flow has been reached at Broad and Market Streets, at Broad

Street and Clinton Avenue and at Broad Street and Central Avenue, and that in order to relieve this condition it is necessary to establish new routes on parallel streets within the central zone.

PLANS FOR RELIEVING TRAFFIC ON BROAD STREET

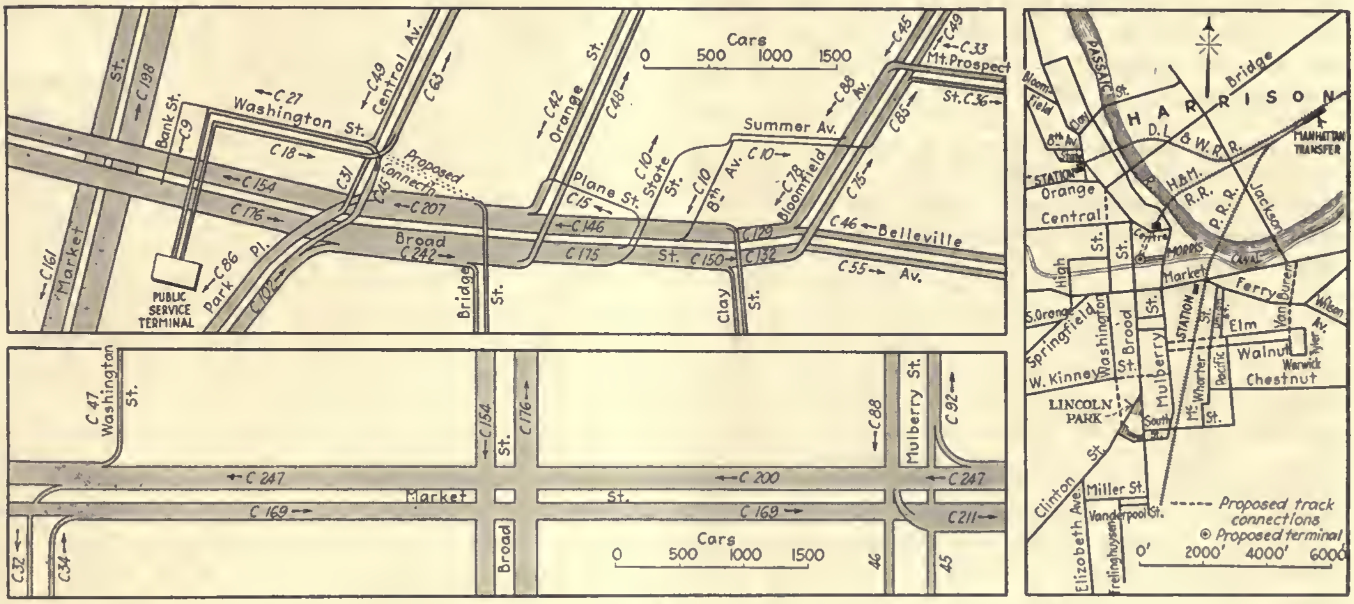
It is suggested that the Hudson & Manhattan station be relocated as an underground station in Military Park opposite the present Public Service Terminal, as was contemplated in 1910 (see map). This would eliminate the existing traffic interchange at the Park Place station, and the rerouting of the surface cars would be made less difficult if a double-track extension was built on Washington Street from Central Avenue north to Broad and from Kinney Street south to Clinton Avenue.

It is also suggested that the city stand the expense of eliminating the offset now existing in Washington Street where it crosses Market Street so that an additional route can be operated from Broad Street to Clinton Avenue via Washington. As the situation now exists this route is impracticable, due to the offset in the street and the heavy traffic on Market Street that would have to be crossed.

Many of the attempts at improvement of the traffic conditions in Newark have been based upon the assumption that the great majority of travelers had as their ultimate destination the intersection of Market and Broad Streets. This assumption is so far from the facts that remedies based upon it have, in a number of instances, served still further to embarrass a large portion of the traveling public. It is quite true that many persons have as their destination some point in close proximity to Market and Broad Streets, but there are also other extremely important destination points. First, the Pennsylvania Railroad Station on Market Street, although not of the importance it once was, cannot longer be ignored in plans for handling traffic; second, Central Railroad Station on Broad Street; third, Park Place Station of Hudson & Manhattan Railroad; fourth, Lackawanna Station on upper Broad Street.

Any study will show that factories are located in all parts of Newark, many of them at very considerable distances from the center of the city. The majority of the commuters to the business part of the city have as their destination various points in an area extending from the Lackawanna Station on the north to Clinton Avenue on the south and from the Courthouse on the west to the Pennsylvania Railroad Station on the east.

At present it is a fairly easy matter to obtain transportation from almost any point in and around Newark to the intersection of Market and Broad or to the Public Service Railway Terminal, but to go from the extreme northern end or the extreme southern end of the city to the Pennsylvania Railroad Station is not at all easy. It is equally difficult to reach the eastern and western parts of the city from the Lackawanna Depot on north Broad Street or the City Hall on south Broad Street. In street railway transportation greatest efficiency obtains only when through routes can be operated. Through routing, however, is only feasible when a sufficient number of persons are traveling with a fair degree of regularity over a substantial portion of the particular routes.



DIAGRAMS SHOWING CAR FLOW ALONG MARKET AND BROAD STREETS, NEWARK, N. J.

At top, car flow diagram, Broad Street (Newark) between Market Street and Bloomfield Avenue during evening rush hour on Sept. 17, 1920. At right, existing and proposed trolley routes in center of Newark, N. J. At bottom, car flow diagram, Market Street (Newark) between Mulberry Street and Washington Street during evening rush hour.

It is suggested that a loop be built around Lincoln Park. The Public Service Railway Company could then reroute its Broad and Mount Prospect lines so that the northern portions of these lines would terminate at the proposed Lincoln Park loop, while the southern portions could terminate at the existing Lackawanna loop.

It is believed that with the rerouting proposed, the speed of the cars on Broad Street, particularly during the periods of congested traffic, would be materially increased, thereby greatly improving the service and resulting undoubtedly in greater satisfaction on the part of the traveling public. It is believed also that the extensions would doubtless provide for the normal increase in traffic for a considerable number of years.

MARKET STREET CONDITIONS

A similar study was made of the car flow on Market Street as illustrated above. This diagram indicates graphically the number of trolley cars operating past certain intersections. The junction of Market and Mulberry Streets is the heaviest intersection. Here 638 cars pass in the two-hour rush period, equivalent to one car every 11.3 seconds. This is due to the large number of cars routed to the terminal via Mulberry Street in addition to the regular service on that street. Other important junctions on Market Street are at Springfield Avenue and High Street, where there was a total of 325 cars for the rush period of two hours, and also at Market Street and Springfield Avenue, where there were 306 cars.

On Market Street the scheduled running time between the Pennsylvania Railroad and High Street during the rush hours is nine minutes. The distance between these points is approximately 0.86 mile and the speed per trip would thus be approximately 5.7 m.p.h. Between 5:30 and 6:30 p.m. it was impossible for the operators on the majority of the westbound cars to make this scheduled running time, for the cars only developed an average speed of approximately 3.98 m.p.h., or, in other words, thirteen minutes was necessary to make a nine-minute run. Many of the delays were due to the car density on Market Street and the time required in loading or discharging passengers, especially at Broad and Market Streets.

The traffic conditions on Market Street between Mulberry Street and the Pennsylvania Railroad loop are unsatisfactory because Market Street is comparatively narrow between these points. It was observed that the large number of motor vehicles which operate between these points on Market Street greatly retard the operation of the trolley cars. This condition is also dangerous to the patrons of the company desiring to board the cars.

To relieve the excessive car flow density on Market Street the report recommends that immediate steps be taken to establish new traffic routes on parallel streets, following the same general direction as the present route on Market Street. The proposed routes are shown on the map and consist of a double-track line on West Kinney Street from Washington Street to Mulberry Street, with single track east on Walnut Street and west on Elm Street, as these two streets are not of sufficient width to permit the laying of double tracks thereon.

Standardizing Practices in Handling Merchandise Traffic

North Shore Line Has Developed Book of Rules for Agents, Conductors and Other Employees Who Handle l.c.l. Matter—Would Be of Assistance to Other Electric Railway Lines

NEARLY every electric railway management that has started in the business of handling package freight will agree with the sentiment expressed by Britton I. Budd, president Chicago, North Shore & Milwaukee Railroad, that this step involves a lot of hard work and "grief." To go through the process of building up an organization, getting equipment and facilities and working out a system for handling the business expeditiously and without excessive losses is obviously no small task. Then an almost worse problem is that of expanding the organization, facilities and system designed for a $3,000 or $4,000 a month business to handle a $40,000 a month business, particularly when the rate of expansion is well-nigh overwhelming. A certain amount of unsatisfactory service is bound to develop under such conditions.

But appreciating the futility of the work of the man who goes out to sell the service of the railway and succeeds in securing new customers only to have his company fall down in "delivering the goods," Mr. Budd has had a thorough study made by an expert from the steam railway field in an effort to make the service actually rendered live up to the intentions of the company as near 100 per cent as possible. This traffic expert first directed his attention to an analysis of the complaints and correction of the causes for them. This gave him a line on many of the weaknesses in the methods employed and in the organization functioning. He then made a thorough property-wide study of the system of handling this merchandise dispatch business and as a result proceeded to standardize all routine as far as possible. It was found that 90 per cent of the duties of the merchandise dispatch employees could be laid down in a set of rules, leaving but 10 per cent of the total routine to be covered by special orders. These rules have been printed and distributed to the employees involved, and Mr. Budd says they have already had a noticeable effect in reducing delays and claims and, hence, in improving the service.

While the percentage of claims on the North Shore line in this service has not been any higher than what is common in steam road service, Mr. Budd feels that it should be much less in view of the smaller volume of traffic handled and the shorter mileage of the road. The development of a complete set of regulations, resulting in the standardization of practices at all stations, and making inexcusable any incomplete billing, acceptance of improperly packed or poorly consigned shipments, etc., should be a material help in this respect. The printed rules will also materially simplify the task of breaking in new men in the service.

It is believed that a study of this book, though developed to cover the particular conditions on the North Shore lines, would be of substantial assistance to other electric lines in systematizing and otherwise improving their l.c.l. service. A copy of this book of "Rules and Regulations Governing the Handling of Merchandise Traffic," which is printed in loose-leaf form to permit ready correction and enlargement, would no doubt be furnished upon request to Mr. Budd. It was the desire of the editors of the ELECTRIC RAILWAY JOURNAL to reprint this rule book, but space limitations make this impractical, and as the subject matter does not lend itself to abstracting the above plan of calling attention to the work done by the North Shore line seems to be the only feasible way to bring it to the attention of other electric railway men. An idea of the contents can be gained from a list of the first few of the 104 headings under which the subject matter is at present grouped: Merchandise received subject to tariffs; marking merchandise; time, not guaranteed; address of consignee; packing; method of loading; contaminating merchandise; separate local and through merchandise; overloading cars; ordering cars; waybilling merchandise, etc.

According to the annual report of the Department of Public Works, Chicago, 70,078 cu.yd. of snow were removed during the year 1919 from 13,588,196 sq.yd. of streets in the first ward downtown district of Chicago at a cost of $54,052,092, or 77 cents per cubic yard. Also 51,588 cu.yd. were removed from 7,943,892 sq.yd. of main thoroughfares in other parts of the city at a cost of $34,353, or 66 cents per cubic yard.

Insurance Rates Reduced 38 per Cent

Putting House in Order Permits East St. Louis & Suburban Railway to Increase Protection 95 per Cent, with But 16.6 per Cent Increase in the Cost—Keen Competition Inspired Among the Several Departments of the Company as a Result of Monthly Reports

THE East St. Louis & Suburban Railway has found it a very profitable undertaking to co-operate wholeheartedly with the Electrical Inspection Bureau in carrying out the recommendations of the latter's inspectors. These men make it a part of their regular work, if any interest is shown, to report to the insured on the condition of the property from the standpoint of fire risk and to make recommendations as to improvements which, if made, will bring a reduction of so many cents per hundred dollars in the rate charged for protection. This work of the inspection bureau is done on the theory that the insurance companies would rather carry a good risk at a low rate than a bad risk at a high rate.

Getting into the spirit of the work of the Electrical Inspection Bureau, President W. H. Sawyer of the railway set out during 1920 to place the various properties of the company in order in the way that the inspectors wanted it, but restricting the activities of the first year to only those improvements which it could be shown would pay for themselves in two years, through reduced insurance. Carrying out this plan, an expenditure for the entire East St. Louis & Suburban property of approximately $9,000 was made, with a resulting annual saving in the cost of insurance of more than $4,000. That is, in 1919, before the clean-up campaign was started, the rate which the company had to pay was 62.88 cents, while the rate on the 1920 contract is 39.2 cents. Actually, however, the saving made was turned into increased protection.

In 1919 the total insurance carried was approximately $900,000 and the annual cost $5,895. This was increased in 1920 to approximately $1,756,000, for which the cost was $6,875, or an increase of $980—16.6 per cent in cost for a 95 per cent increase in insurance. The additional insurance was placed largely on substations and the principal power house, which had previously been carried as fireproof buildings without insurance, but two fires therein had rather conclusively determined that protection was needed.

SOME OF THE DETAIL IMPROVEMENTS MADE

Some of the improvements made at the Winstanley Power House in East St. Louis will serve to indicate what was done over the property generally to accomplish the results noted above. A new fire alarm box was installed close to the power station at a cost of $224.77 to produce an annual saving in the cost of insurance of $101.80. Two additional stand pipes were installed in the power house at a cost of $296.18, with a saving of $254.50. Two additional watchmen's clock stations were installed at a cost of $98 to produce an annual saving of $120. All wooden lockers for workmen scattered through the power station were replaced with steel lockers arranged in two or three groups and equipped with slanting tops to prevent the storage of any articles on top. This change was made at a cost of $201.96 and it resulted in an annual saving of $101.80.

Previously, new and junk materials were stored in lockers and cubbyholes and miscellaneous places in the basement, in addition to five main store places in the basement. All of these materials and supplies were taken from the basement and placed in a non-combustible general storeroom provided by bricking in the space underneath the high-tension switching room, which is supported on concrete pillars, as shown in an accompanying picture. Furthermore, the miscellaneous cubbyholes in the basement were bricked in so that they could not be accumulation places for future junk and rubbish. The total cost for this piece of work was $780 and it produced an annual saving of $305.

FIREPROOF STOREROOM AT WINSTANLEY POWER HOUSE PROVIDED BY BRICKING IN THE SPACE UNDERNEATH THE HIGH-TENSION SWITCHING ROOM

One of the biggest savings was made by the installation of Bowser oil pumps and tanks in the main turbine room to replace the old system of simply placing the barrels on their sides and drawing off the oil as needed. The tanks were installed at a cost of $1,190 and they resulted in an annual saving on the insurance cost of $763.50. In addition, there will accrue the saving of about one-half gallon of oil per barrel, which cannot be drained from a barrel, but is withdrawn by the oil pumps, according to the station engineer.

A steel shed for protecting workmen from the weather while unloading coal was built to replace a wooden shed. As this was a piece of work which had to be done regardless of the bearing on insurance, and as the new steel shed was extended to provide a storeroom for the boiler room supplies, which did not exist with the wooden structure, the cost of this item was not charged to the insurance clean-up plan. However, it produced a saving in insurance of $101.80 annually. This shed is shown in one of the accompanying pictures.

Other miscellaneous improvements at the power house included the placing of all conductors and resistors on metal instead of wood supports, resulting in a saving of $509; the replacement of all wooden stairs with concrete, built solid to prevent accumulation of material underneath and producing a saving of $245; the removal of work benches from the turbine room to a special room fitted up for a mechanic's shop at a saving of $50.90 per year; the installation of more steel waste cans; the replacement of wooden scrap bins with concrete bins, the purchase of more fire extinguishers, etc.

In addition to these physical improvements, the program has included a general campaign among the workmen to induce them to keep their work places clean and free from any accumulation of rags or rubbish. Each man endeavors to leave his work place in the best of condition every night. This work of appealing to the men to keep things clean and safe has been very successful because it has been possible to show them where this care results in actual money saving to the company, through reduction in insurance rates. Mr. Sawyer believes that the men do better work and that they have more self-respect if their place of employment is kept in an orderly manner.

A rather keen competition between different departments of the company in this matter of orderliness has been inspired as the result of the monthly reports made by H. J. Hodson, who has charge of the safety work of the company and of this insurance campaign. After his monthly inspection tour, which is made at the most unexpected times, Mr. Hodson writes a report in which all of the properties are classified into three divisions under these headings: "In a clean and orderly condition," "In a fairly clean condition" and "In a dirty and disorderly condition." When a department is listed under the second or third heading, it is accompanied by a few brief remarks giving the nature of the condition which has brought this classification. After these reports are written, they are submitted to Mr. Sawyer and then posted simultaneously on every bulletin board and sent to every department head. The result of this monthly report has been to promote great effort and care among the workmen to keep their department in the first group. For this reason, any one displaying slovenly work is usually "called" by his fellow employees.

STEEL SHED BUILT TO REPLACE WOODEN PROTECTION FOR COAL UNLOADERS, AND EXTENDED TO PROVIDE STORAGE FOR BOILER ROOM SUPPLIES

Because of his frequent visits over the entire property and his close contact with the employees in all branches of the company's service Mr. Hodson has been very helpful to Mr. Sawyer in providing a close contact between the management and the employees. Mr. Hodson has often been able to bring to the attention of Mr. Sawyer cases of employees in personal difficulties, wherein a little timely help on the part of the company could be given with a very worth-while effect.

Rebuilt Cars Relieve Shortage

Winnipeg Electric Railway Has Replaced Rolling Stock Lost by Fire Last April with Cars Reconstructed from Second-Hand Bodies Purchased from the Twin City Rapid Transit Company

THE Winnipeg (Man.) Electric Railway has just placed in service twenty remodeled low-floor cars. These embody most of the latest features of rolling stock for city service and replace those lost in the fire at the company's Main Street carhouse on April 7, 1920. Following the destruction of the cars in the fire bids for new cars were asked for, but immediate delivery could not be promised. It was imperative that the amount of rolling stock be increased in order to take care of the winter rush and so the company purchased twenty passenger car bodies without trucks or motors from the Twin City Rapid Transit Company of Minneapolis, Minn., in July last and has rehabilitated them in its own shops.

DETAILS OF THE REMODELING

In the process of reconstruction the cars were first stripped of their rear vestibules, interior fittings and front and rear bulkheads, all to be replaced by the features which make up the company's standard, single-end, double-track, pay-as-you-enter, low-floor car with front and rear exit and rear entrance. In order to incorporate these features in the reconstructed cars it was found necessary to lengthen the rear vestibule 30 in. This was accomplished by placing on each side of the car one ½-in. x 5-in. x 5-in. angle-iron vestibule knee extending back 8¾ in. from outside the car body, parallel with the sides of the car to a point of intersection on the ½-in. x 7-in. steel bumper. These vestibule knees are supported by carrier bolts and plates held by the steel body truss under the bulkhead. These, in addition to extensions on old vestibule knees and lateral braces, hold the vestibule firmly in position. The original vestibule was replaced next, posts were securely bolted to the crown head and the intervening space in the floor and roof was filled in. This gives ample room for the conductor's compartment and for the entrance and exit double-folding doors.

As the front vestibule floor of the old cars was on the same level as the car floor it was found necessary to provide a drop pit the size of the front passenger vestibule in order to have but one step from the vestibule floor to the pavement. The steps on these cars are 15 in. from pavement to first step, 14 in. from first step to vestibule floor and 6 in. from vestibule floor into the car. The car is furnished with six rattan cross seats on each side, with longitudinal seats on both sides, front and rear, giving in all a seating capacity of forty-two passengers.

PREVENTING INRUSH OF COLD AIR

The front bulkhead has a double-acting door leading into the passenger vestibule which closes off the cold and draft when the front vestibule door on the outside is open. This door is operated jointly with the step from the motorman's compartment by means of McGuire-Cummings door-and-step operating mechanism. All steps in and out of the car are equipped with Mason lead-filled safety tread, thus minimizing accidents due to passengers slipping on the steps. The rear entrance and exit doors are operated by the conductor, the same mechanism and similar features as applied to the front

PARTIAL LIST OF DIMENSIONS IN THE REBUILT CAR

Over-all length	45 ft. 7 in.
Car body length	33 ft. 3 in.
Front vestibule length	4 ft. 4 in.
Rear vestibule length	6 ft. 10 in.
Over-all width	8 ft. 6 in.
Over-all height	8 ft. 4⅛ in.
Rail to top of roof	10 ft. 8⅛ in.
Approximate weight	36,000 lb.

door being used. The entrance to the car is the rear door of the rear vestibule, giving ample standing room while conductor is making change or issuing transfers.

Destination signs are placed in three locations—one on the right side of the front vestibule in the gothic sash and one on each side in the last gothic sash on the car body. These signs are of the roller type and are worked from the inside of the car body. There are forty-seven route names on each.

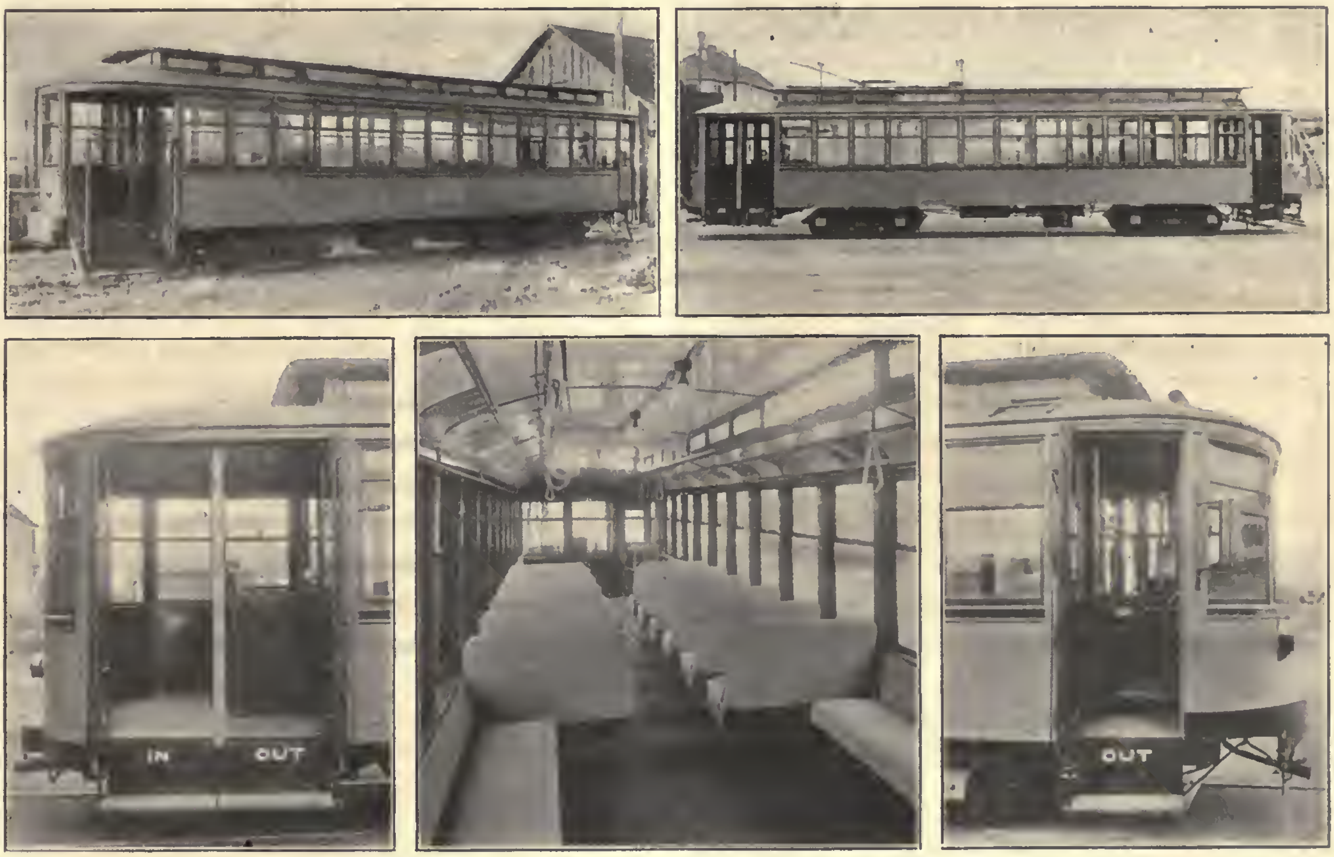
The cars are equipped with a hot-water heating system and are fitted throughout with new equipment of the latest design which comprises McGuire-Cummings No. 46 archbar trucks with 26-in. steel wheels; GE-258-C air-cooled ball-bearing motors, inside hung K6 controllers; National compressors; type G Westinghouse governors; M.R. circuit breakers; three-bank type C. G. resistor; 8-in. brake cylinders and Dayton No. 45 drop brake handles.

To give safety and convenience to the passengers, the cars are equipped with a door signal system the operation of which notifies the motorman by means of a small lamp placed in front of him when the doors are closed or open.

The Faraday high-tension buzzer system is used, with a buzzer in the front and rear vestibules. The lighting system of the car comprises one 23-watt five-light circuit with trouble light. This circuit includes the headlight, front-exit light, front destination sign light and two lights in the rear vestibule. There is also one 56-watt, five-light circuit in the car body and a selector system in conjunction therewith. All the lights in the car body and vestibules are fitted with large opal shades. The conductor's cab is equipped with an individual electric heater, folding seat, foot rest, etc.

Some dimensions of these cars are given in the accompanying table.

In the painting of the cars the enamel system has been used for the exterior and headlinings, the color scheme being tan color below belt rail, ivory above belt rail, with the exception of sash and doors, which are of cherry, while the roof is oxide red. The interior is of natural cherry oiled and varnished with ivory headlinings.



AT TOP, APPEARANCE OF CAR BEFORE AND AFTER RECONSTRUCTION; CENTER VIEW, SEATING ARRANGEMENT OF REMODELED CAR; REAR (LEFT) AND FRONT (RIGHT) PLATFORMS AS RECONSTRUCTED

Attacking the Snow Problem

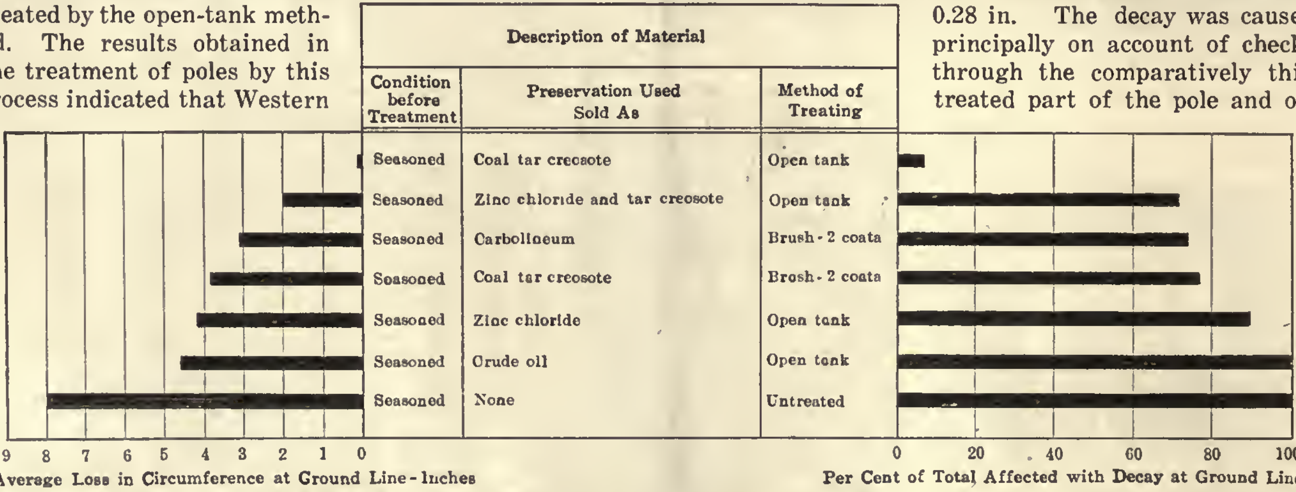
THE New York State Bureau of Municipal Information has sought reports from American cities, according to the February issue of the *American City*, on the method and kind of apparatus used for snow removal, in order to make available to municipal officials complete and up-to-date information. This is important because of the necessity of keeping at least the main arteries of travel free from snow. The reports seemed to indicate that municipal authorities are paying more attention to their methods of attack and consequently have formed some sort of an organization. Some now recognize the efficacy of beginning work while the snow is falling. The reports agree that wherever possible effective machinery should be used to reduce dependence on labor to a minimum, including the use of equipment available for temporary conversion for snow fighting.

Results with Butt-Treated Poles in California

Average Life of Butt-Treated Pine Poles Was 8.4 Years, Compared with 3.8 Years for Untreated Poles—93 per Cent of Similarly Treated Western Red Cedar Poles Sound After Eleven Years

AT THE seventeenth annual meeting of the American Wood Preservers' Association, held from Jan. 25 to 27, 1921, at San Francisco, P. R. Hicks, engineer in forest products, Forest Products Laboratory, Madison, Wis., presented a paper on experiments with butt-treated poles in California. In 1907 and 1908 the Forest Service, in co-operation with the various California electric companies, carried on a number of experiments to obtain information on the seasoning of poles and the efficiency of several preservatives and methods of butt treatment. The Western yellow pine was studied to determine whether butt-treated local timber could be satisfactorily used as a substitute for the relatively high-priced Western red cedar poles, which were usually obtained from the Pacific Northwest.

It was found that greater absorption and penetration of all preservatives were obtained in the Western yellow pine than in the cedar poles treated by the open-tank method. The results obtained in the treatment of poles by this process indicated that Western red cedar poles should be seasoned to at least 25 lb. per cubic foot before treatment, which required two to eight months in this experiment, depending upon the season the poles arrived in southern California. Western red cedar could not be successfully impregnated with crude oil by the open-tank method, although a satisfactory treatment was obtained on the Western yellow pine poles. Satisfactory absorptions were obtained in the open-tank treatment of the pine and cedar poles with zinc chloride, although the pine absorbed more preservative, with a probable greater penetration, than the cedar poles. Western red cedar poles seasoned to only 31 lb. per cubic foot could be treated successfully with zinc chloride compared to 25 lb. per cubic foot which was found desirable for successful treatments with creosote.



Condition before Treatment	Preservation Used Sold As	Method of Treating
Seasoned	Coal tar creosote	Open tank
Seasoned	Zinc chloride and tar creosote	Open tank
Seasoned	Carbolineum	Brush - 2 coats
Seasoned	Coal tar creosote	Brush - 2 coats
Seasoned	Zinc chloride	Open tank
Seasoned	Crude oil	Open tank
Seasoned	None	Untreated

CONDITION OF EXPERIMENTAL WESTERN RED CEDAR POLES IN VICINITY OF LOS ANGELES, CAL., ELEVEN YEARS AFTER PLACEMENT

The average life of the pine poles, butt-treated with creosote by the open-tank process, was 8.4 years, compared with 3.8 years for the untreated poles. The relatively short life of these treated poles was not on account of the failure of the treatment in the butt, but was caused by decay in the untreated top. About one-half of the pole butt-treated in zinc chloride was, however, removed on account of the decay in the treated butt. Approximately one-third of the pole butt treated with crude oil by the open-tank method failed on account of decay in the treated butt. There was no appreciable difference in the relative durability of the pine poles butt-treated with creosote and with carbolineum. The small difference in favor of the carbolineum is not sufficient to have much weight, especially in view of the result obtained in other similar experiments.

These experiments demonstrated that butt-treated Western yellow pine poles cannot be successfully used in southern California, in comparison with untreated or similarly treated Western red cedar poles, on account of the failure of the untreated tops. If this species is to be used for poles in southern California the entire pole should be treated, preferably with creosote.

Further conclusions reached showed that the depth of penetration of the preservative appears to exercise the controlling influence on the durability of butt-treated cedar poles. An average penetration of 0.56 in. was obtained in the open-tank treatment with creosote. Out of a total of 375 poles given this treatment 349, or 93.1 per cent, were still sound, and 26, or 6.9 per cent, were partly decayed after eleven years' service. The average penetration of the twenty-six poles which were partly decayed was only 0.28 in. The decay was caused principally on account of checks through the comparatively thin treated part of the pole and occurred in most cases simply as a decayed pocket, while the rest of the butt was sound. The poles treated in an open tank with zinc chloride and creosote were in somewhat better condition than those treated with creosote or with carbolineum. The butt-treated cedar poles were in better condition than those treated with zinc chloride by the open tank process.

In this experiment the value of the open-tank treatment with creosote as compared with butt treatment stands out clearly. The results with the butt treatment, however, are very good, and undoubtedly this treatment is a good investment where a better treatment is for some reason or other impracticable.

In analyzing the above data and in comparing the results obtained with treated and untreated poles in other parts of the country it must be kept in mind that on account of climatic conditions in southern California these experimental poles are subjected to decay throughout the entire year.

The creosote used for the treatment of these poles was purchased as coal-tar creosote, while the carbolineum used was what is known in the trade as "Carbolineum America."

Temperature Effects in Power Cables*

Electrical Engineers at A. I. E. E. Midwinter Convention Discuss Vital Subject of Cable Loading and Temperature as Related to Life—Possible Change in Standard Rule of Institute in View—Present Rule Considered Conservative, but Sentiment Favors Reasonable Factor of Safety to Insure Satisfactory Durability

AT THE Thursday morning session of the recent midwinter convention of the American Institute of Electrical Engineers six papers were presented under the auspices of the sub-committee on wires and cables of the standards committee. The papers were as follows: "The Maximum Safe Operating Temperatures of Low-Voltage Paper Insulated Cables," by W. A. Del Mar, chief engineer Habirshaw Electric Cable Company; "Permissible Operating Temperature of Impregnated Paper Insulation in which the Dielectric Stress is Low," by Philip Torchio, chief electrical engineer New York Edison Company; "Permissible Operating Temperatures of Impregnated Paper Insulation in which the Dielectric Stress is Low," by D. W. Roper, superintendent of street department Commonwealth Edison Company; "Notes on the Effect of Heat on Impregnated Paper from Cable Insulation," by W. S. Clark, engineer wire and cables General Electric Company; "The Effect of Heat Upon Paper Insulation," by H. W. Fisher, chief engineer Standard Underground Cable Company, and R. W. Atkinson, assistant to chief engineer Standard Underground Cable Company; "Permissible Operating Temperatures of Impregnated Paper Insulation in which the Dielectric Stress is Low," by L. L. Elden, electrical engineer the Edison Electric Illuminating Company of Boston.

STATEMENT OF THE PROBLEM

In opening the symposium Mr. Del Mar listed these five questions as embodying the preliminary problems involved in determining the safe operating temperature of an insulating material:

1. What is the criterion of quality of paper insulation by which we may say whether it is satisfactory for service?
2. What is the effect of the continued application of various degrees of heat, expressed in terms of the criterion selected?
3. Will intermittent heat have the same effect as continuous heat provided the aggregate time of exposure and the temperature are the same in both cases?
4. If the above questions should be satisfactorily answered, what form of rule should be adopted so as to make the best economic use of the information thus obtained?
5. If a rational rule for the maximum permissible temperature of paper insulation should be developed, how can the hottest-spot temperature of a cable in a duct be measured in order to insure that the cable is working within the rule?

For low-voltage cables the criterion of quality is mechanical strength, best indicated by means of the tearing test. For this test a piece of paper about 3 cm. wide is carefully cut with a razor along its center line from one end to about its center and a pencil mark made 1 cm. beyond. It is then suspended from one of the small ends and a balance pan is attached to the small free end, the large end being allowed to swing free. Sand is then poured continuously into the pan until the paper begins to tear. The stream of sand is then continued slowly, stopping if the paper continues to tear, but proceeding if the tearing stops. It is continued until the tear reaches the centimeter mark. The total weight of pan and sand is taken as the tearing strength of the paper. The tearing strength of unimpregnated Manila rope paper 8 mils thick, under ordinary conditions, is from 6 to 10 oz. When the paper is impregnated the tearing strength is usually less than this.

Mr. Del Mar gave the results of tests made to determine the effects on insulating paper of moisture, continuous heating and intermittent operation. He concluded, however, that even with all of the above questions satisfactorily answered there would still be the difficulty of applying the information to practical operating conditions, because it is almost impossible to ascertain accurately the hottest-spot temperature of a cable in a duct. This problem is complicated by the presence of other cables in neighboring ducts and by the variable thermal resistivity of the soil.

The present interest in this subject arises from the increased loads which war conditions suddenly imposed on the power plants and the consequent enforced operation of cables at higher temperatures than were previously thought safe. Experience indicates that low-voltage cables may be operated at higher temperatures than were considered safe a few years ago.

OPERATING TEMPERATURES FOR CABLES

In his paper Mr. Torchio reviewed the effect of temperature on insulating materials, abstracting from the 1913 Steinmetz and Lamme report to the Institute and the 1905 British Engineering Standards Committee tests. He gave surveys of low-tension cables in large distributing systems, and special tests on cables including sheath cracking, high temperature tests, effect of bending on cables heated to high temperatures, distillation of cable compounds, ambient temperatures in subway ducts as affected by thermal conductivity of concrete, amount of moisture in soil, different arrangements of ducts and load factors at which the cables are operated.

He stated that the principal reasons advanced for adopting lower temperature limits than 105 deg. C. for cables have been: (1) That the compound in the cable, when warm, may leave the paper, especially when the cable is installed in inclined ducts, with a tendency to flood the lower portion of the cable and to leave the upper part of the cable dry; (2) that cables are oftentimes removed from subways for reinstallation in other locations and, therefore, if the paper becomes brittle, it would crack inside the lead sheath. Further, low temperatures are advocated because the expansion and contraction of long lengths of large size lead-covered cables may cause cracking of the lead sheath at sharp bends in manholes.

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*Abstracts of a group of papers presented at Ninth Midwinter Convention of American Institute of Electrical Engineers, New York City, Feb. 17, 1921.

He showed these reasons are insufficient to make an exception to the A. I. E. E. standards rules for Class A insulation for 105 deg. C. for low-tension cables:

RECOMMENDATIONS FOR TEMPERATURE LIMITS

After analysis of available operating data Mr. Torchio's conclusion was that the permissible operating temperatures of impregnated paper insulation, in which dielectric stress is low, are to be a function of the load factor at which the cable operates. The load factor for cables used in systems of distribution is intended to be the ratio between the yearly average load and the maximum load on the cable. He suggested for consideration for impregnated-paper, low-tension cables the temperature limits in function of the load factor of the cable, as follows: 105 deg. C. for load factors around 33 per cent, 95 deg. C. for those around 50 per cent, and 90 deg. C. for those over 66 per cent.

CABLE EXPERIENCE IN CHICAGO

In his brief paper Mr. Roper told of practical experience with cable loads in Chicago. Test data indicate that the maximum copper temperature of low-tension feeder cables in the large and crowded conduits of the Commonwealth Edison Company immediately adjacent to the substations is generally higher than 105 deg. C., and in a number of locations considerably exceeds this figure for several hours per day for each of five days in the week during the winter months.

He considered it reasonable to conclude that when the copper of one of the low-tension cables on the distribution system reaches a maximum temperature of 180 deg. it is being heated beyond a safe limit, and deterioration of the insulation will result, and, further, that the deterioration will be greater if there are holes in the lead sheath at the point where such temperatures are reached.

Mr. Roper concluded also that not only should due consideration be given to the time during which the maximum temperature of the copper persists, but also that in an operating system it is not possible to determine the maximum safe limit exactly, as the temperatures are continually changing. Apparently the best that can be done is to determine the maximum temperature and also plot average curves showing the number of hours per year that temperatures near the maximum are maintained. From an examination of the insulation of cables corresponding to a number of such curves it should be possible to establish, first, a lower limit at which the insulation will not be injured, even when the temperature is maintained for long periods of time, and, second, an upper limit above which it is certain that the insulation will be injured if such temperature is maintained for any considerable time. From the information so far obtained in Chicago, the best that can be done is to place the lower limit at about 110 deg. C. and the upper limit at about 180 deg. C.

RESULTS OF MANUFACTURERS' TESTS

Mr. Clark gave the results of tests made within the past four years to determine the effect of heat on impregnated paper. Experimental data showed that under the action of heat the tensile strength of the paper deteriorates less rapidly than its resistance to tearing. From the results obtained Mr. Clark felt warranted in stating, in a preliminary way, that deterioration at 70 deg. is negligible; at 100 deg. it is marked in ninety days; at 110 deg. it is marked in thirty days, applying to the particular quality of paper and impregnating compound which were under test. He concluded that the temperature limit fixed for the operation of a low-tension cable, to avoid undue deterioration, must take into consideration the length of time during which the temperature is maintained.

Messrs. Fisher and Atkinson discussed in detail the mechanical properties of papers, especially as influenced by drying, heating and impregnating. They described an instrument for measuring tearing strength, which differed from that mentioned in Mr. Del Mar's paper in that a spring is employed instead of a weight. They based their paper upon the results of tests made under a wide variety of conditions.

Among many interesting facts developed the first striking one is that impregnation itself affects only very slightly the tearing resistance of the paper. The cause of the great loss of tearing strength when the sample of paper is dried and impregnated is the change in moisture content and is not due to the impregnation with compound. The next fact is the large variation in tearing resistance with change in moisture content of the paper. With the paper tested and with the oils used, and for the relatively short series of tests which were made, there was a small difference between the aging effect at a given temperature of paper submerged in oil and paper exposed to air in an inclosed vessel, either sealed or unsealed.

Coming to the matter of allowable temperatures for cables, Messrs. Fisher and Atkinson pointed out that while cables have been in service for long periods of time and with various degrees of deterioration of the paper, even up to practically complete carbonization, there is not any extensive record of the serviceability of cable in considerably damaged condition. Furthermore, it is probable that such cable furnishes a large proportion of the operating failures that are not due entirely to external injury, an amount of failure insignificant in comparison with the amount of such cable in service, and such cables may fail in service from injury due to causes which would not be harmful to good cable. Many of the cables known to have operated successfully after severe overheating have had very liberal insulation thicknesses.

The authors considered that it would be unreasonable for the A. I. E. E. to standardize operating conditions which would materially reduce the serviceability of cables from the standpoint of ability to remove and reinstall them without injury. They suggested that a temperature limit be assigned which may be expected to produce a reduction of 20 per cent of the original tearing resistance of the paper in, say, five years. This would work out somewhat as follows for temperature allowances:

For continuously maintained temperature..............	78 deg.
For maximum temperature maintained five hours per day, temperature during remaining part of day low..	85 deg.
For maximum temperature maintained two and one-half hours per day, temperature during remaining part of day low..	90 deg.
For maximum temperature maintained one-half hour per day, temperature during remaining part of day low..	100 deg.

BOSTON EDISON LOADING PRACTICE IS CONSERVATIVE

The final paper in the series, by L. L. Elden, gave the results of the experience of the Edison Electric Illuminating Company of Boston. He stated there is no doubt as to the safety of low-voltage cable operation indefinitely at the 85-deg. allowance provided in the present standards rule. In the last analysis the sheath temperature is the only definite factor from which to determine the actual operating temperature of a cable, since from it the temperature of the conductor can be determined with fair accuracy. It cannot be denied, stated Mr. Elden, that if paper is subjected to high temperatures its useful life as insulation must be shortened, but the real question for the cable user to decide is the rate of depreciation that he is willing to accept as the result of operating his cables at high temperatures.

The practice in Boston has been not to exceed the temperature limit of 85 deg. C. During eighteen years of use of single-conductor and concentric low-tension feeder cables there is no record of a failure of these due to loading conditions. While this practice may be considered ultra-conservative it is felt to be justified by the freedom from service interruptions.

Referring to Mr. Torchio's suggestion as to a load-factor basis for rating, Mr. Elden expressed preference for an overload rating for low-tension cables which may be taken advantage of as occasion requires. The objection which he raised to the load-factor basis of rating was the impracticability of application to the operation of any system of distribution, as in practice each feeder operates on a load factor of its own.

SUBJECT DISCUSSED FROM SEVERAL ANGLES

Following the presentation of the papers abstracted above, the topic was treated briefly by a number of cable makers and users. Without reference to these by name the substance of their remarks was as follows: One said that expansion and contraction of cables is not given the attention it deserves. He gave the life of a cable as twenty years. Most of those discussing the subject did not favor an increase in temperature rating, preferring to have the rating conservative and to depend upon the judgment of the operating engineer as to the circumstances under which the rating can be safely exceeded.

Standardization of Insulated Wires and Cables

A CONFERENCE on the standardization of insulated wires and cables was held in New York on Feb. 2. The conference, which was called by the American Engineering Standards Committee at the instance of the American Railway Engineering Association, was attended by representatives of fourteen national organizations. After a thorough discussion of the many considerations involved, it was unanimously decided that "The unification of specifications for wires and cables for other than telephone and telegraph use should be undertaken under one general plan, covering substantially all the more important uses." It was agreed that work on the following should be included: Conductor, quality, stranding, sizes; rubber insulation; varnished-cloth insulation; impregnated paper insulation; magnet wire (including enamel, cotton and silk insulation); fibrous covering (including asbestos); sheaths; armor; standard make-ups.

It was the consensus of opinion that it would be desirable to have all the American wire and cable standards assembled in a single book. The proposed work will be carried out under the auspices and rules of procedure of the Standards Committee.

Canadian Railway Club Considers Tramway Operation

Montreal Tramways Department Head Explains How Co-operation Between Public and Street Railway Operators Can Be Made to Yield Large Savings and Improved Service—Meeting Attended by About 200

A MEETING of the Canadian Railway Club, held in Montreal Feb. 8, was attended by about 200 members and guests. Among the latter were a number of electric railway men from Boston and New York who were on their way to the American Association meeting at Chicago.

D. E. Blair, superintendent of rolling stock Montreal Tramways, read a paper under the title "Some Engineering Features of Tramway Operation." His purpose was to discuss in a general way the practice which underlies an efficient system of transportation, and he drew a line clearly between those factors whose development lies in the hands of the operating company and those from which beneficial results can come only through the help of the public.

Mr. Blair explained that present tramway equipment has reached a high standard. The art has reached the stage where little that is within control of the railway managers remains to be done to improve the standards of modern car service. He raised the question as to whether existing conditions can be modified, without injury to other interests, so as to result in worth-while improvements, and the paper is the author's answer to his own question. A few of his principal points are summarized below:

The primary requisites of a satisfactory system of transportation include speed, safety, comfort, continuity, frequency and convenience of service. Associated closely with these is economy. Speed of transportation should be the outstanding objective of all effort toward improvement, and increase of speed within the practical limitations of street traffic will tend toward greater economy without necessarily affecting the question of safety. Higher speed will add materially to service efficiency.

Mr. Blair based the body of his paper on a discussion of the elements of the "speed-time curve," taking up separately the acceleration, coasting, braking and rest periods. He outlined the mechanics of this subject in non-mathematical fashion and showed how intelligent operation of a car will conduce to economy. He emphasized also the urgency of reducing the number and duration of stops, a phase of operation which is largely in the hands of the public. Of special importance are traffic delays and, under present conditions, operating companies are providing far more cars than are necessary to perform the relatively poor service rendered, but it is physically impossible to bring these cars into efficient and expeditious service on account of the slow dispatch of car units past congested areas.

Summarizing the whole situation, Mr. Blair lists the following points: Higher schedule speeds are desirable from every point of view, and can be obtained without extra cost and without affecting safety of operation. The higher speeds will result in an improved degree of comfort and frequency of service on account of reduced overcrowding and reduced headway between cars. The securing of speeds higher than those now prevailing depends almost entirely on reducing the number and duration of stops, decrease in the former item being more important than in the latter. The patrons' convenience is only a relative factor, because an extra walking distance of a few feet is of no real moment when compared with the outstanding advantage of quick transportation. Appreciably higher speeds cannot be obtained by any possible means within the control of operating companies; improved service rests in the hands of the users of cars. Questions of car design, motor equipment, routing of cars, etc., are important, but their effect on the quality of service is negligible when compared with the possibilities of improvement along the lines suggested. The bogie of high cost cannot be used as an argument against faster service because higher speeds in city transportation tend toward lower operating costs. Higher speeds will result in a more efficient use of existing equipment. It is absolutely essential that all possible means of increasing efficiency of existing rolling stock be investigated to offset at least in part the increase in labor cost.

In the discussion which followed the presentation of Mr. Blair's paper, C. N. Duffy, Philadelphia Rapid Transit Company, spoke of the good results obtained in Philadelphia by the use of skip stops and pay-as-you-pass cars, eliminating much of the time lost in the rest periods. He laid particular emphasis on the absolute necessity of educating the public to see that it is as much to the people's advantage to increase speed of cars as it is to that of the railway. If they can once be made to realize this, there would soon be a demand that stops be placed farther apart than they are.

T. Ahearn, president Ottawa Electric Railway, spoke of the results he had witnessed in Cleveland and San Diego in the use of pay-as-you-pass cars. He had been so strongly impressed by the saving in time and the resulting increased speed of the service that he expects before long to introduce the same plan in Ottawa. He also dwelt briefly on the saving in time and power achieved through the use of power-on-time recorders which had recently been installed in Ottawa. He reinforced Mr. Blair's point that the best way to operate a car, from both the safety and economy standpoints, is to accelerate and brake rapidly, coasting as far as possible.

Col. J. E. Hutcheson, general manager Montreal Tramways, added to the discussion along the lines of public education, which he said is one of the vital factors in speeding service. He also pointed out some of the difficulties in doing this educational work. Colonel Gaudet, Director of Public Works of the city of Montreal, expressed much interest in that part of Mr. Blair's paper relating to safety stops, regulation of service and overcrowding of cars. He voiced his desire to have the general principles outlined put into concrete shape for application in Montreal.

Owing to the fact that the delegates to the Chicago conference had to leave before the meeting was concluded, the meeting adjourned after brief remarks by W. F. Graves, chief engineer Montreal Tramways, and G. Gordon Gale, vice-president Hull Electric Company, recently elected president of the Canadian Electric Railway Association. A vote of thanks to Mr. Blair was passed, with the suggestion that the discussion could have been carried further with much profit.

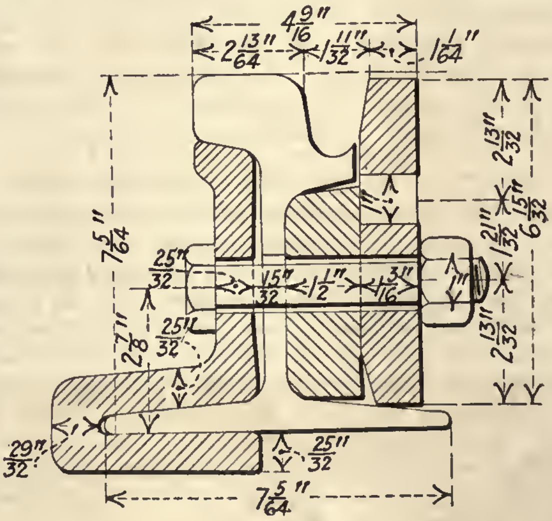
The Bureau of Economics of California has recommended the development of hydro-electric power and electrification of railroads to conserve the oil supply of states.

German Association Meets

THE annual meeting of the Verein-Deutscher Strassenbahn und Kleinbahn Verwaltungen was held in Nuremberg Nov. 28-Dec. 1. Papers were presented on the following subjects, among others: Fares, freight traffic, track construction in asphalt and wood paved streets, rail joints, the economic situation, rail corrugation, roadway maintenance, automatic couplings.

The association has five standing committees, as follows: (1) Rail corrugation, (2) standardization, (3) rails for curves, (4) anti-friction bearings, (5) wear of steel tires. At the Nuremberg meeting reports were received from each of these committees.

The committee on rail corrugation presented two papers, one by Professor Oberhofer of Breslau, describing tests which had been conducted with high and low carbon steel, the other by Chief Engineer Wochert of Mannheim, who discussed the possibility of oscillating friction being a cause of corrugation. The committee on rails recommended among other standards two types of rails for curves, one a guard rail of normal section for curves of 50 meters (165 ft.) radius and over, and a renewable lip rail for curves of smaller radius. A section of the latter for a 180 mm. (7 in.) rail is shown, the dimensions being given in inches. The renewable lip is made of manganese steel. Tests are being conducted by Committee No. 4 on all types of anti-friction bearings and by Committee No. 5 to determine the proper carbon content for tires under different conditions.



GUARD RAIL WITH RENEWABLE LIP FOR SHORT RADIUS CURVES

The president of the association during the past year has been Director Wussow of the Grosse Berliner Strassbahn, and Prof.-Dr. F. Helm has been secretary.

In its annual report for 1920, the Ontario Safety League, which has its headquarters in Toronto, lists a large number of items of safety work which have been conducted along lines somewhat similar to those followed by the National Safety Council. During the year a three-day convention was held, with representatives from provinces other than Ontario, and an intensive "safety-week drive" was also conducted in fifteen towns and cities in the province with excellent results. Work with the electric railways constitutes an important branch of this safety service.

Copper Requires Careful Handling

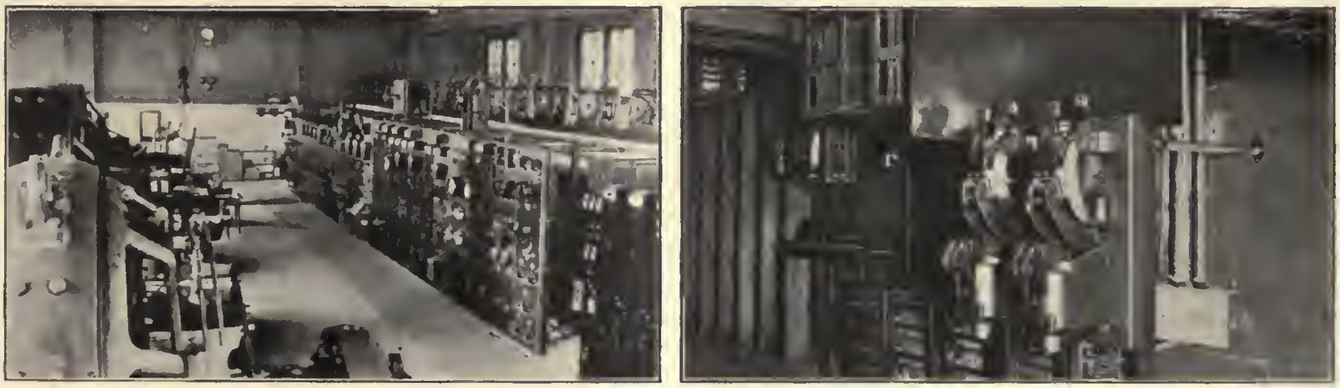
AN ARTICLE of considerable value to motor repair men dealing with the handling of copper appeared in the February issue of the *Electric Journal* over the signature of J. V. Dobson. He points out that copper cannot be given the same rough treatment that iron, steel or brass will withstand, but requires certain precautions in handling and application. For example, all bends in copper should be made free and easy, for where sharp bends and sharp fillets are made, the effects of vibration, expansion and contraction, or the "throwing out" forces due to rotation, show up first. Nicking also should be avoided because nicks are the starting points for breaks.

It is very easy to nick copper with the sharp edge of a metal drift or with a knife at the point where the insulation has been cut off a wire. Furthermore, the necessity is usually overlooked of providing means for the copper to expand and contract to take care of the relative motion between the different materials for the changes in temperature. As to centrifugal-force effects, even though the weight of a solid conductor may seem small, it is sufficient under vibration to cause motor and field leads to fail miserably if not properly supported.

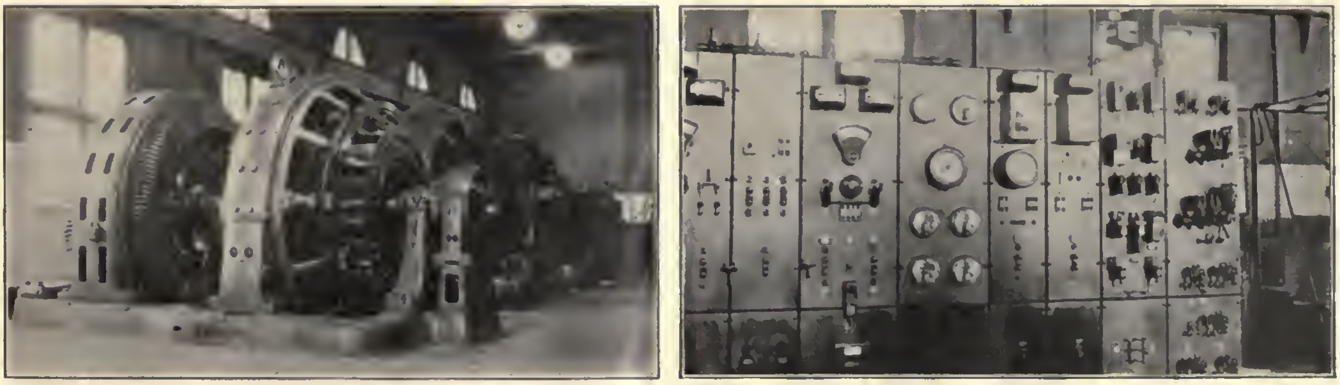
Copper is subject to a form of sickness, which so far as has been experienced is peculiar to it alone. All commercial copper contains a small amount of oxygen in the form of copper oxide, without which it had poor mechanical characteristics. When heated in a flame rich in free hydrogen, this hydrogen unites with oxygen forming free copper and steam. The hydrogen will readily enter the hot copper, but the steam cannot get out. The copper is thus not only weakened by the elimination of the copper oxide, but the high-pressure steam expands, producing a spongy effect which still further weakens the copper. This effect is, of course, greatest near the surface. This peculiar form of sickness should be guarded against by operating men. When copper is heated in a gas and air furnace an excess of air should always be used, as deficiency of air will produce an excess of free hydrogen.

2,000-Kw. Motor-Generator Set of the Michigan Central Railroad

MENTION was made in the issue of the ELECTRIC RAILWAY JOURNAL of Jan. 8, 1921, in an abstract of a review prepared by W. D. Bearce, railway and traction engineering department General Electric Company, of the 2,000-kw., 660-volt synchronous motor-generator set with complete automatic control for the Detroit River tunnel electrification of the Michigan Central Railroad. This unit, which has been in operation for several months, is now the largest in railway service to be operated by automatic control. The accompanying illustrations showing it were made from recent photographs. The two machines in the background are the 1,000-kw. synchronous motor-generators installed with the original equipment. In the close-up view of the switchboard the section on the extreme right is the automatic contactor panel and adjacent to it the automatic relay panel. Then come three sections which are feeder and meter panels, while the next two are respectively the motor panel for the new set and the compensator and auxiliary panel. The remainder of the auxiliary equipment is installed in the basement.



AT LEFT, GENERAL VIEW OF SWITCHBOARD IN MICHIGAN CENTRAL DETROIT RIVER TUNNEL SUBSTATION. AT RIGHT, POSITIVE BREAKERS INSTALLED IN THE BASEMENT OF THE STATION



AT LEFT, 2,000-KW. SYNCHRONOUS MOTOR-GENERATOR SET. AT RIGHT, VIEW OF THE SWITCHBOARD, SHOWING SOME OF THE AUTOMATIC PANELS

Novel Base for Incentive

Proposal to Have It Vary in Service-at-Cost Franchises as Fares Vary from an Established Ratio of Fares to Money Rates or Commodity Values

A NOVEL method of establishing an incentive in service-at-cost franchises for public utilities was suggested Jan. 28 in a talk on this subject before the Grand Rapids Engineering Society by Harry Barker, of Horton, Barker & Wheeler, engineers. Mr. Barker first points out it is not wholly desirable with a bonus to the stockholders or to the men and management to have the bonus rise as rates fall and fall as rates rise. Costs and rates naturally tend to rise as prices rise, and it will not do at a time of high prices to cut off the inducements for economies and efficiencies just when they are most needed. A better plan, in his opinion, is to set up parallel ranges of base rates and base costs as measured by, say, bank loans, or the Dun index figures for prices of commodities and labor might be used. From such a table, a base rate can be found that is normal for the prevailing cost of money (or prevailing prices of commodities and labor). Then for each step that actual rates are lower than this normal rate the bonuses might be stepped up in accordance with a prearranged scale. Mr. Barker believes that the management and men should share in any bonus plan.

To illustrate his plan he assumes a case where a careful investigation has shown that the fares of a certain street railway under normal operation with fair profit were more or less as follows:

3½ cent fare when money was at	3½ per cent
4 -cent fare when money was at	4 per cent
4½-cent fare when money was at	4½ per cent
5 -cent fare when money was at	5 per cent
5½-cent fare when money was at	5½ per cent
6 -cent fare when money was at	6 per cent
6½-cent fare when money was at	6½ per cent
7 -cent fare when money was at	7 per cent
7½-cent fare when money was at	7½ per cent
8 -cent fare when money was at	8 per cent

Then if actual fares were 7 per cent and bank money was being loaned out at 6 per cent, this hypothetical company would get no bonus, for the normal fare for 6 per cent money is 6 cents. If, however, by good management and effective co-operation by the employees the fares were brought down to 5½ cents in times of 6 per cent money, then the company and the employees would get one step of a bonus—say one-half of 1 per cent extra return on the franchise valuation for the company, and for the men 4 per cent bonus on their yearly wage. If continued progress by company and employees brought the fares down to 5 cents and money still stayed at 6 per cent then the company would be allowed 1 per cent extra return on valuation, and the men would get 8 per cent bonus on wages.

Mr. Barker said that the direct ratio quoted above was intended of course as purely illustrative and not definitely to apply to any specific railway. He also suggested that any bonus incentives to be fair should be recast every five, ten or fifteen years so that as the peculiar economies of one property and management are overtaken by the general progress of the art the public shall not continue to pay the bonus.

In the same address Mr. Barker also discussed the proper size of the index reserve fund under a service-at-cost franchise and spoke of from 4 to 12 per cent of the value of the system as being a figure at normal level which has been used. In his opinion this fund could often economically be carried as a bookkeeping reserve and the cash put to work, in the same manner that the depreciation reserve is now commonly handled.

Rehabilitating Brick Pavements

AN ECONOMICAL method of repairing a brick pavement in Appleton, Wis., the surface of which had become very rough and corrugated, was described in the February issue of the *American City*. There were places in the pavement where the joints were worn down between the bricks from ½ to 1¼ in. from the original surface, and it was estimated that it would cost $1 per sq.yd. to turn over and clean the bricks of the 29,000 sq.yd. of pavement in question.

The method finally resorted to was to clean the pavement thoroughly by flushing and then go over the surface with brooms and small hooks to remove all the dirt between the joints that the flusher had not taken out. After the pavement was thoroughly dry a ¼-in. coating of Tarvia "A" was spread on the surface of the brick. The Tarvia was worked at about a temperature of 225 deg. F. The material was spread evenly with ordinary floor squeegees with a rubber edge and then a coating of pea or roofing gravel was spread to a depth of about ½ in. After the gravel was applied a 10-ton roller was run over the surface, which forced the gravel into the binder in the joints between the bricks, while the gravel that lay on the surface of the brick was generally crushed to several smaller pieces.

Applying this new surface to the street, including the cleaning, applying binder, rolling, etc., took about ten days. The total cost per square yard amounted to about 15 cents. It took about ½ gal. of Tarvia to cover a square yard and about 1 cu.yd. of sand was enough to cover 96½ sq.yd. of surface.

Steam and Electric Operation on the Rhaetian Railway

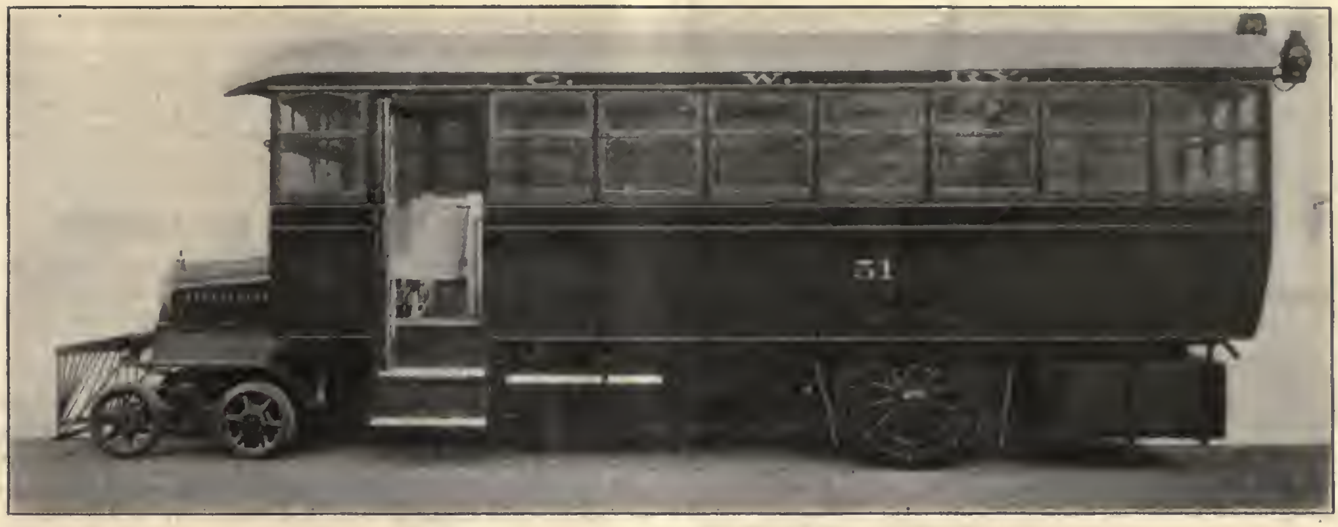
THE Rhaetian Railway operates about 186 miles of meter-gage track in the canton of Grisons, Switzerland. Electrification was commenced in 1913 and it is not yet completed. The early electrification was covered in the issue of this paper for April 4, 1914, page 760. The accompanying data from the issue of *Schweizerische Bauzeitung* for Dec. 11, 1920, show not only the figures for electric operation but permit comparison with steam.

OPERATING DATA OF RHAETIAN RAILWAY, SWITZERLAND

Year	Gross Thousand Ton-Miles	Energy Consumption in Kilowatt-Hours	Energy Consumption Watt-hrs. per Gross Ton-Mile	Energy Cost per Kilowatt-Hour Cents	Coal Consumption and Cost per Gross Ton-Mile with Steam Locomotives		Energy Cost with Electric Locomotives per Gross Ton-Mile, Cent	Lubricant per Thousand Gross Ton-Miles	
					Pound	Cent		Steam, Pounds	Electric, Pounds
1913	14,070[1]	980,450[1]	69.6	1.426[2]	0.340	0.106	0.100	1.1	0.8
1914	21,610	1,537,750	71.0	1.770	0.325	0.111	0.118	0.7	0.6
1915	18,150	1,370,850	75.5	1.804	0.328	0.116	0.136	0.7	0.6
1916	18,200	1,369,100	75.2	1.806	0.319	0.127	0.136	0.6	0.6
1917	16,980	1,303,200	76.6	1.870	0.311	0.136	0.143	0.6	0.6
1918	16,560	1,245,700	75.2	1.930	0.326	0.385	0.144	0.5	0.5
1919	25,970	2,140,900	82.5	1.554	0.337	0.595	0.125	0.6	0.5

[1] Six months only.

[2] Based on 19.3 cents exchange value of the Swiss franc. Electrical energy is purchased from the Brusio Supply Company.



NEW GASOLINE VEHICLE FOR USE ON RAILS

One-Man Gasoline Motor Car

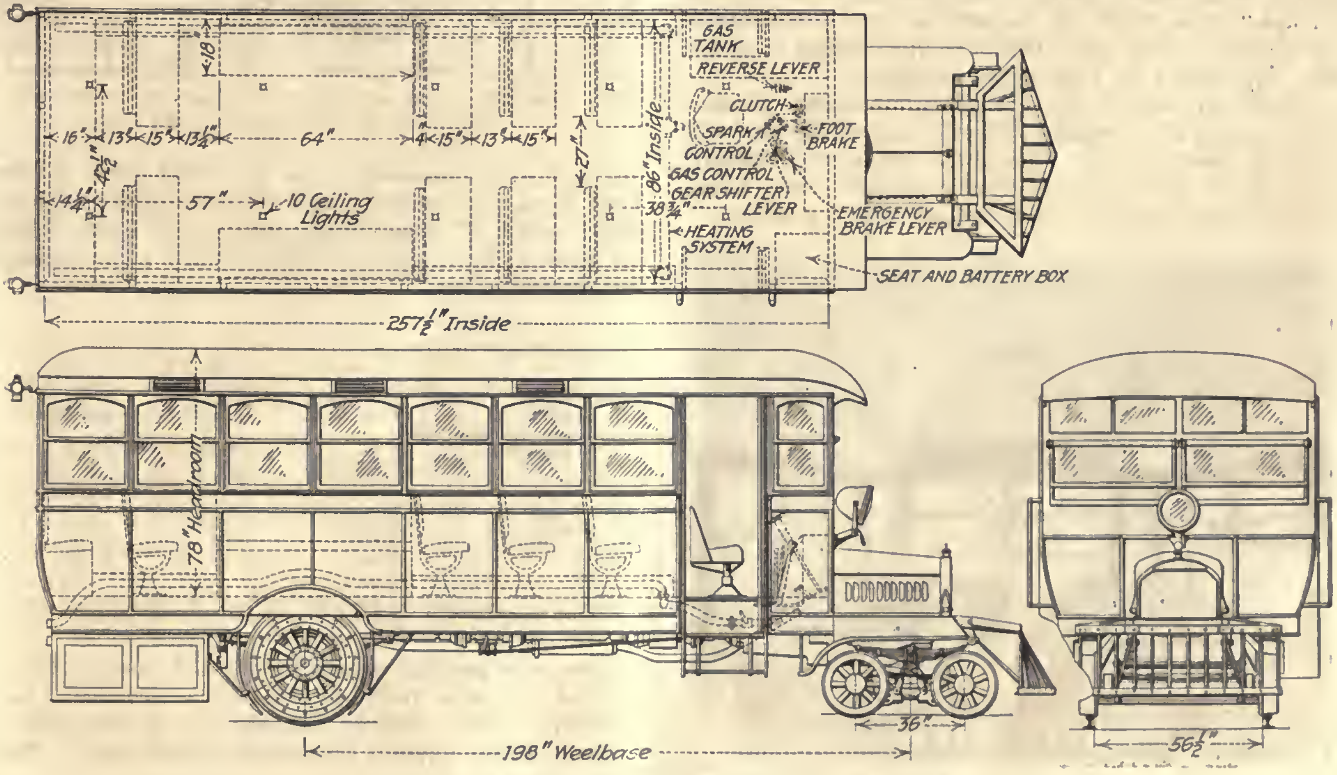
A New Vehicle for Operation on Rails, Built for Use on the Chesapeake-Western Railway, a Steam Line in Virginia, Has the Front End Mounted on a Small Four-Wheel Pivotal Truck

A NOVEL form of gasoline-driven motor railroad car has been put in commission by the Chesapeake-Western Railway, a steam road in Virginia. The car resembles the large type of single-deck motor bus extensively operated on the streets of cities, with the difference that under the front of the vehicle is a small four-wheel pivotal truck which enables the vehicle to take curves more easily and at higher rates of speed than with two wheels and axle of the ordinary bus.

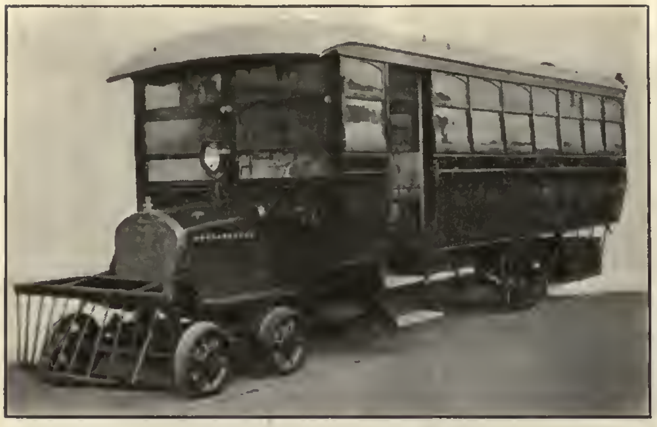
The car consists essentially of a 2-ton Mack dual-reduction motor truck, a Mack standard engine and transmission, with an additional transmission to give three speeds in reverse instead of the usual one speed. The following are the principal dimensions:

Wheelbase of chassis	16 ft. 6 in.
Wheelbase of pony truck	3 ft.
Seating capacity	31 passengers and driver
Length over corner posts	21 ft. 11 in.
Length over pilot	27 ft. 10 in.
Width of posts at belt rail	7 ft. 10½ in.
Weight complete	12,000 lb.

This new type of rail bus is being put on the market by the International Motor Company, New York City, which supplied the chassis and power plant, while the body and pony truck were built and installed on the chassis by the J. G. Brill Company, Philadelphia. The body was constructed according to the best body building practice, having a composite underframe of yellow pine side sills, oak end sills and 3-in., 4-lb. steel channel crossings, all securely bracketed together. The



PLAN AND ELEVATIONS OF THE NEW VEHICLE



A PONY TRUCK FACILITATES HIGH-SPEED OPERATION

upright members are of ash and from the bottom of the side sill to the belt rail the body is sheathed in No. 18 sheet steel. The letter boards are of poplar.

The roof is of the plain arched type and is greatly reinforced by the use of suitable steel rafters placed advantageously to strengthen the construction where needed. The roof boards are 5/16-in. poplar and are covered with No. 8 canvas well lined in white lead. Three ventilators of the Brill "exhaust" type, used extensively on electric railways, are placed along the center line of the roof.

A two-leaf folding door is located on each side of the front end of the body and is manually operated by the driver from his seated position. Two stationary steps are included at each door opening for passengers entering and leaving the bus.

The upper part of the double side-sash is stationary, while the lower is arranged to drop into a window pocket. In the front end of the body one of the sashes on each side is hinged similar to the standard motor bus windshield practice.

The seats are of the Brill light-weight non-reversible "Waylo" type, which are the same as used in the single-end Birney safety car. They are upholstered in rattan and equipped with bronze grab handles.

Under the body at the rear are provided two baggage boxes which are strapped to the bottom of the bus with suitable hoop irons. Four Brill patented "Dumpit" sand boxes are supplied, two over each rear wheel, mechanically operated from the operator's position.

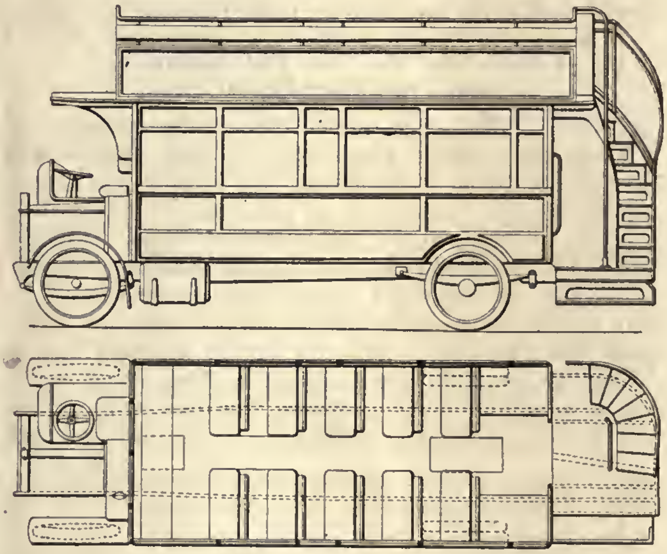
THE CAR IS WELL LIGHTED AND VENTILATED

The field which is visualized by the makers for this car is particularly the interurban railway and short-line railroad where the high costs of operating and maintaining steam equipment are causing heavy deficits. A car of this type can be run at a fraction of the cost of steam equipment.

Fifty-four Seat Bus for London

Capacity Raised from Thirty-four to Fifty-four Seats by London General Omnibus Company Within Three Years, with But 2 Ft. Increase in Over-All Length and 16 per Cent Increase in Weight

THE years 1919 and 1920 have seen a remarkable advance in the design and capacity of motor buses by the London General Omnibus Company through its building ally, the Associated Equipment Company. It will be recalled* that up to 1919 the standard city bus of the London General Omnibus Company was a thirty-four-seat double-decker designated as Type B. This was a mobile vehicle but not particularly fast because the rear platform was too narrow to permit entrance and exit simultaneously. As the lower deck of the Type B was not wide enough for cross seats on both sides, most "B" buses had longitudinal seats below, but a few had cross-seats on one side and a longitudinal seat on the other.



NEW TYPE S BUS AS PLANNED TO SEAT FIFTY-SEVEN, BUT LATER MODIFIED TO SEAT FIFTY-FOUR

COMPARISONS OF DOUBLE-DECK, OPEN-TOP LONDON BUSES

	Type B	Type K	Type S
Seats	34	46	54
Over-all length	22 ft., 6.5 in.	22 ft., 6.5 in.	24 ft., 7 in.
Body length	11 ft., 9.25 in.	13 ft., 10.75 in.	16 ft., 11 in.
Actual linear dimension per seated passenger	8 in.	5.87 in.	5.46 in.
Over-all width	6 ft., 10 in.	7 ft., 1 in.	7 ft., 1 in.
Wheelbase	12 ft., 10.62 in.	14 ft., 2.25 in.	14 ft., 11 in.
Track	5 ft., 8 in.	5 ft., 10 in.	5 ft., 10 in.
Rear overhang	7 ft., 7.38 in.	6 ft., 8 in.	7 ft., 2.75 in.
Weight empty	8,064 lb.	7,924 lb.	9,380 lb.
Weight per seat	237 lb.	172.8 lb.	173.5 lb.
Horsepower*	30 hp.	30 hp.	34 hp.

* According to the formula of the American Society of Automobile Engineers, these ratings would be 24 hp. and 27.2 hp., respectively. The standard 47-seater of the Fifth Avenue Coach Company has a nominal rating of 25 hp.

Because of great increases in wages, it became uneconomical to run a thirty-four-seater, especially as the standard seating capacity of the partly competitive London County Council tramcar is seventy-eight. The company therefore brought out a forty-six-seater, designated Type K, which made such advantageous use of high-strength materials that it weighed only 7,924 lb., or actually less than the thirty-four-seater it was replacing. The seating and passenger interchange features of this bus were also a great advance on the Type B.

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*See ELECTRIC RAILWAY JOURNAL, Oct. 11, 1919.

The lower deck seat layout followed the popular American street car pattern of short longitudinal seats (three per seat) at the rear and 32-in. cross seats on both sides for the rest of the compartment. This arrangement, in combination with a platform 3 ft. 10 in. instead of 3 ft. long, made for faster interchange of entering and departing passengers. The length of this bus from crank handle to rear clearance was 22 ft. 6½ in. and the width over the lower deck 6 ft. 10 in. By the end of 1920, the company already had in operation more than 400 of the 1,000 Type K buses which were ordered.

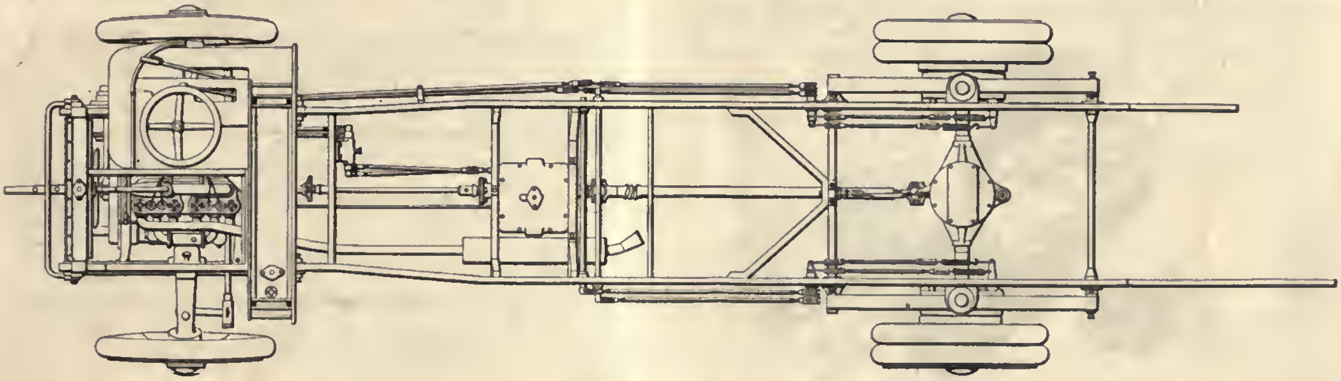
With the coming of still further increases in wages and the demands of growing traffic, the company was obliged to work out a still bigger bus, although the Type K at 7,924 lb. (3 tons 10 cwt. 3 quarters British) empty represented the maximum weight then permitted by London police regulations. However, permission was eventually obtained for the operation of a limited number of the fifty-four-seat Type S buses briefly described in the following paragraph:

In design, materials and general layout the Type S is simply a longer Type K, the increase in seating capacity from forty-six to fifty-four being obtained by an increase in length from 22 ft. 6½ in. to 24 ft. 7 in. Nickel-steel and ash are the principal body framing materials. At first it was planned to make allowances for fifty-seven seats, as shown in the diagram on the previous page. This caused overcrowding, with the result that the seating arrangement was cut down to fifty-four.

The longitudinal corner seats in the lower deck instead of seating only two were made to seat three, the same as in the Type K bus. The long cross seat at the front, where five passengers were to sit riding backward, was taken out. With the final arrangement five cross seats were left on each side, which, together with the end longitudinal seats, gave a total seating capacity of twenty-six on the lower deck. The upper deck seats twenty-eight. The maximum width (over moldings) is but 7 ft. 1 in. The weight of this new type bus when empty is 9,380 lb. (4 tons 3 cwt. 3 quarters British) or 173.5 lb. per seat compared with 172.8 lb. per seat for the Type K forty-six-seater and 237 lb. per seat for the Type B. The accompanying table also shows the fact that the street occupancy per seated passenger has been materially reduced in linear dimensions as follows: Type B, 8 in.; Type K, 5.87 in.; Type S, 5.46 in. At the same time, the width over all has gone up only 3 in., namely, from 6 ft. 10 in. to 7 ft. 1 in. Several score of the 200 Type S buses ordered are already in use.

In comparison with the foregoing figures, it may be interesting to state that the popular forty-seven-seat open-top bus of the Fifth Avenue Coach Company, New York, is very close to London weight standards inasmuch as its weight per seated passenger, including oil, fuel and water, is 190 to 200 lb. The new enclosed upper-deck sixty-passenger bus of the Chicago Motor Bus Company is reported to weigh 12,500 lb., or only 209 lb. per seat.

Although the London General Omnibus Company did not consider it economical from the upkeep standpoint to run Type B buses more than five years and although war conditions did make it necessary to run them seven years more, it is noteworthy that these buses are still in such shape as to be offered for further use in lighter service elsewhere. Consequently, the Associated Equipment Company is selling large numbers of buses overhauled within six months of date of sale at £500 ($2,000 at £1 = $4) each. The chassis alone is being sold at £450 on a 2-ton motor truck rating. From this it is evident that a well-maintained motor bus may have good resale value in a rising market. The estimated cost of a Type K bus as given by Frank Pick, commercial manager of the company, would have been £691 before the war, whereas it was figured at £1,179 in the year 1919. Thus the resale price of the Type B buses cannot be very far from their pre-war cost new.


CHASSIS OF TYPE S BUS

Department of Public Works Progress

THE secretary of the National Public Works Department Association recently filed his report to the executive committee of the association for 1920. This report outlines the progress which was made during the year toward molding sentiment and furthering legislation with a view to the establishment of a National Department of Public Works. The report reviews the history of the two bills which cover government reorganization and include a Department of Public Works, namely, the Jones-Reavis bill and the McCormick bill.

The secretary says the latter "is perhaps the better of the two." It was drawn a year later than the other one. The report also includes financial statements of the association for the years 1919 and 1920.

ELECTRIC RAILWAY PUBLICITY

Devoted to How to Tell the Story

Dallas Issues Guide to Trainmen

THE Dallas Railway, through its publicity department, has issued a "Guide to Dallas," for distribution to its supervisors, inspectors and trainmen, that they may be able to direct passengers to their destinations intelligently. This booklet shows how every street, block number, public building, cemetery, sanitarium, school, church, hotel and railway line in the city is accessible by street car line. The guide was compiled by R. W. Tarrant, office engineer of the line and track department.

New York Central "Keeps Faith"

THE announcement below, appearing in New York Central timetables, has attracted favorable comment. It stresses the fact the company is keeping faith.

Keeping Faith

THE cars are coming! From now on travelers will notice a gradual transformation in the long trains which recently have been breaking all tonnage records. They will see an ever-increasing number of bright spots—here and there snow-white refrigerators, glossy-black hopper and gondola coal cars, and glistening-red all-steel box cars.

Already the first section of the new equipment ordered by the New York Central Lines immediately following the termination of Federal control has been received from the shops and has gone into the Nation's transportation service. The balance will be delivered continuously and in increasing volume.

These cars come with the advent of the busiest of fall and winter seasons, at a time when they are needed as never before.

WHEN the Government turned the railroads back to their owners, experts computed that approximately $500,000,000 worth of new equipment was the imperative need of the hour. The New York Central Lines immediately placed their $53,000,000 equipment order, covering 196 locomotives, 265 passenger cars and 11,244 freight cars.

These freight cars, if coupled together, would make a solid train ninety miles long. But measured by the total number of efficient cars added to active service, the repair program of the New York Central Lines this year amounts to several times the new construction.

Crippled freight cars to the number of 59,196 were rebuilt and rendered 100 per cent serviceable up to September 1st. During the same period, "medium" repairs were made to 41,222 additional damaged freight cars.

LAST March assurances were given the shippers and the public generally that no time would be lost in meeting the needs of the service, in rehabilitating existing equipment and purchasing new rolling stock.

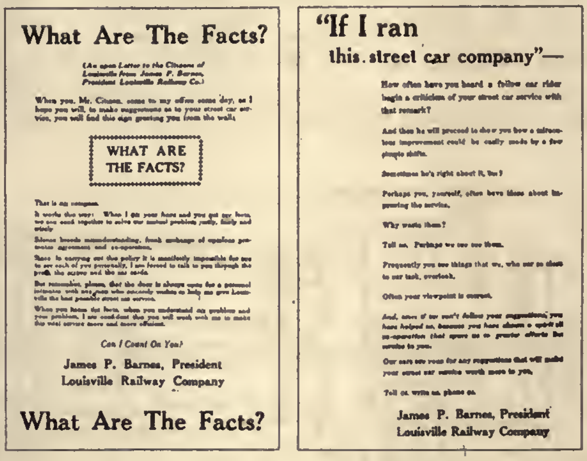
The New York Central Lines are keeping faith.

THE NEW YORK CENTRAL LINES

Michigan Central — Big Four — Lake Erie & Western
Boston & Albany — Toledo & Ohio Central — Pittsburgh & Lake Erie
New York Central and Subsidiary Lines

Louisville Publishes Facts for Higher Fares

THE Louisville (Ky.) Railway, which up to this week was one of the few companies charging a nickel fare, conducted through the newspapers an intense campaign for an increase in fare. It played up in display advertisements the history of the company, its development and what good transport means financially to the city. It also pointed out that of the stock outstanding 98.5 per cent is owned by 82.4 per cent of stockholders, all of whom are citizens of Louisville.



What Are The Facts?

WHAT ARE THE FACTS?

Can I Count On You?

James P. Barnes, President
Louisville Railway Company

What Are The Facts?

"If I ran this street car company"—

James P. Barnes, President
Louisville Railway Company

TYPE OF PUBLICITY USED BY LOUISVILLE RAILWAY TO GET FACTS BEFORE PUBLIC

Another advertisement compares the number of rush-hour cars operated in sixteen representative cities, which shows that Cleveland and Cincinnati are the only ones that provide as many or more cars per 100,000 population served.

Two recent advertisements are reproduced in the illustrations above. The text of another advertisement outlining what the road means to Louisville reads as follows:

The Louisville Railway Company was organized in 1889 as a consolidation of the Central Passenger Railway and the Louisville City Railway.

Today it is operating 168 miles of city trackage. The number of cars operated varies from 311 during rush hours to 125 during non-rush hours. It carries annually 80,000,000 cash fare passengers and 30,000,000 transfer passengers.

By construction and purchase of seven suburban trolley lines, with 102 miles of track, the company has brought into intimate contact with Louisville a large and prosperous suburban population.

It gives employment to 1,806 persons (including the Louisville & Interurban), and its annual payroll is $2,250,000.

It purchases each year supplies and materials to the amount of $900,000, most of which is spent in Louisville.

Bonds to the amount of $12,035,000 and notes to the amount of $684,000 have been issued to provide for replacements, extensions, and more modern service. All of these issues have been marketed through Louisville financial institutions.

Seventeen hundred and eighteen stockholders, of whom 1,389 are citizens of Louisville, have invested $11,823,600 that this community may have an efficient transportation service.

The company has served this community for more than thirty years, providing new equipment, as the need arose, and, up to the present time, has been able to make extensions and improve the service to keep pace with Louisville's growth.

The service it will render in the future depends on the measure of co-operation it receives from citizens of Louisville.

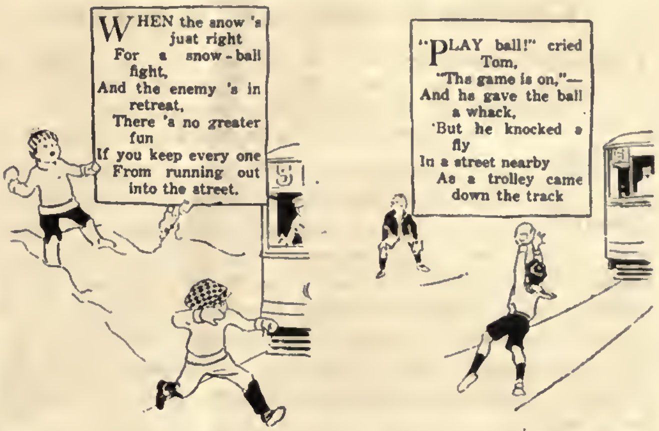
Light Up and Be Seen

A PROMINENT New York advertising man who recently visited Fort Wayne, Ind., made an interesting comment on the advertising value of electric lights as used in generous quantities by the Indiana Service Corporation on its interurban terminal in Fort Wayne. He said: "This company has outlined its terminal in electric lights, and by so doing it makes the station stand out like a fire on a dark night. The location of the station is conspicuous from the main thoroughfare by these lights and is always impressed on the minds of travelers. I think this brilliantly illuminated station is one of the best advertisements for an interurban railway that I have ever seen, and the brilliant lighting is also a real benefit to strangers in the city in that it enables them to find the station quickly. Other service corporations ought to do something of a similar kind."

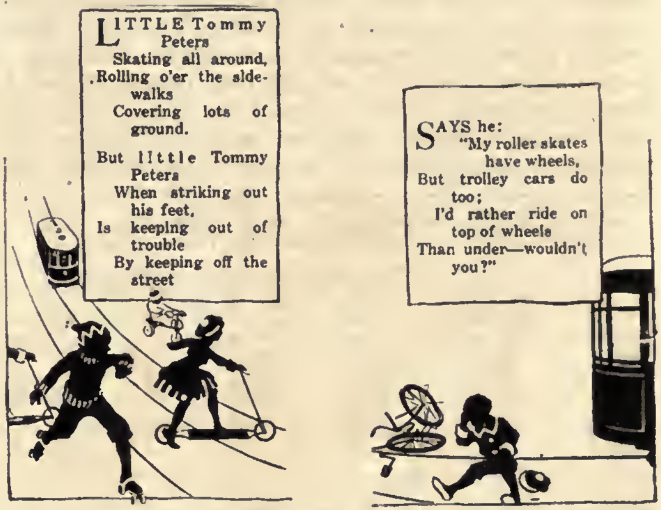
Safety Publicity Among Children

MISS "Safety First" has become quite an established character with the children in Philadelphia in the person of Miss Laura M. Roadifer of the Philadelphia Rapid Transit Company, as has been pointed out already in these columns. The results of her work are notable.

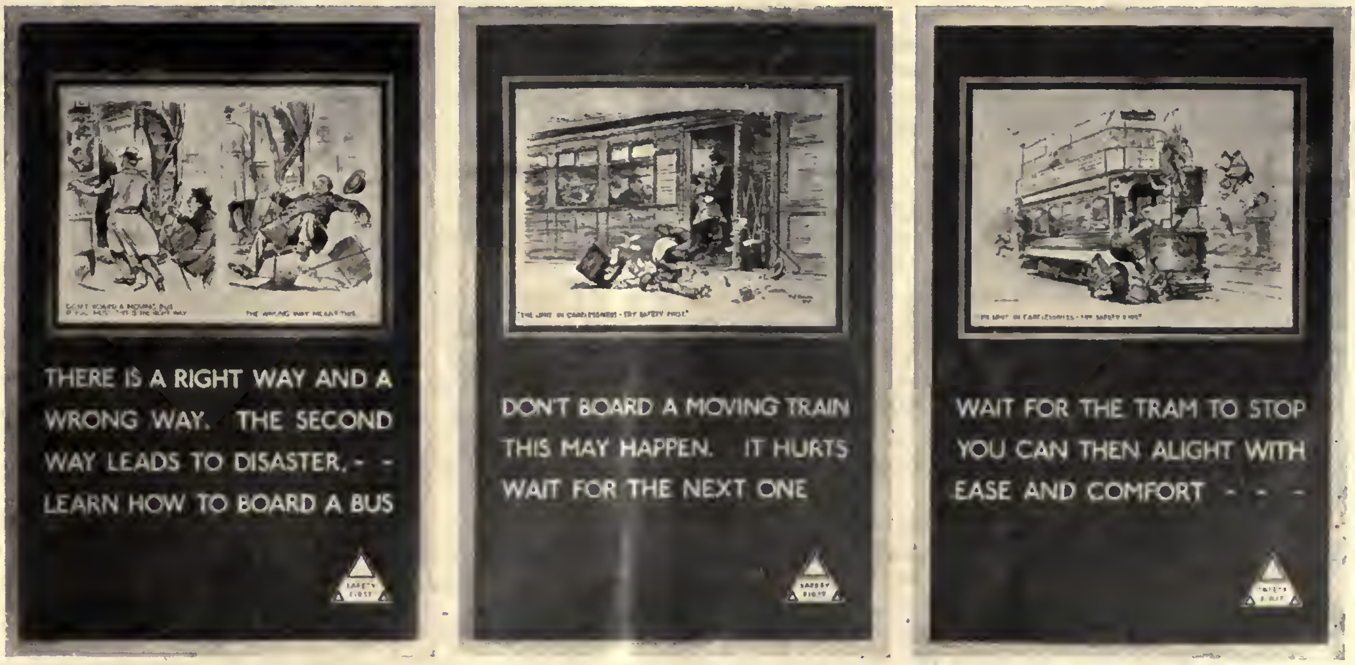
At Christmas time this season the safety department of the Philadelphia Rapid Transit Company issued a children's booklet entitled "A Merry Christmas and a Safe New Year," which was attractively printed in green and red and cleverly illustrated with children's pictures in safe and unsafe experiences with street cars. Two double pages are shown in accompanying illustrations and these are typical of the entire booklet, all of whose text is in children's poetry.


WHEN the snow 's just right
For a snow-ball fight,
And the enemy 's in retreat,
There 's no greater fun
If you keep every one
From running out into the street.
"PLAY ball!" cried Tom,
"The game is on,"—
And he gave the ball a whack,
But he knocked a fly
In a street nearby
As a trolley came down the track

THE PHILADELPHIA RAPID TRANSIT COMPANY USES THIS METHOD TO TEACH CHILDREN THE SAFETY IDEA


LITTLE Tommy Peters
Skating all around,
Rolling o'er the sidewalks
Covering lots of ground.
But little Tommy Peters
When striking out his feet,
Is keeping out of trouble
By keeping off the street
SAYS he:
"My roller skates have wheels,
But trolley cars do too;
I'd rather ride on top of wheels
Than under—wouldn't you?"

Safety Publicity in the British Metropolis


THERE IS A RIGHT WAY AND A WRONG WAY. THE SECOND WAY LEADS TO DISASTER. - - LEARN HOW TO BOARD A BUS
DON'T BOARD A MOVING TRAIN THIS MAY HAPPEN. IT HURTS WAIT FOR THE NEXT ONE
WAIT FOR THE TRAM TO STOP YOU CAN THEN ALIGHT WITH EASE AND COMFORT - - -

BY ILLUSTRATION AND SUITABLE QUOTATION THE LONDON TRAMWAYS INSTRUCT IN THE CORRECT WAY TO BOARD A CAR—AND THE PRICE OF CARELESSNESS

German Conditions Desperate

Fares Have Been Increased in Berlin 1,000 per Cent, in Vienna 1,500 per Cent, While There Has Been a Falling Off of Traffic—Receiverships and Abandonments Have Been Many

THE street railway systems in Germany, both municipal and private, are in much the situation of those in America, but in exaggerated degree. Wages and other operating expenses have increased more rapidly than fares, and there has been a falling off of traffic, especially in the smaller towns. In Berlin, where all of the street railways have been taken over by the municipality, the fare has increased from the original 10 pfennigs to 80 pfennigs and will shortly be 1 mark.

At 80 pfennigs, the system which at the 10-pfennig fare used to be prosperous is now losing from 15,000,000 to 20,000,000 marks per month! It is not expected that the mark fare will make matters much better, and the management believes that with it the limit in fares will be reached. A charge for transfers is to be introduced and freight and mail transportation is being considered. One-man cars have been proposed, but the cost of new one-man cars or even of altering the old cars to adapt them for this service is thought prohibitive. There is no doubt, however, that in smaller towns the one-man cars will be adopted to a great extent.

PERCENTAGES OF CAPITAL STOCK OF GERMAN ELECTRIC RAILWAYS, GROUPED ACCORDING TO DIVIDENDS PAID

Year	No Dividend per Cent	Dividends from 0 to 6 per Cent	Dividends from 6 to 10 per Cent	Dividends of More than 10 per Cent	Total
1907/08	21.30	47.60	29.90	1.20	100
1908/09	19.83	51.26	28.07	0.84	100
1909/10	18023	49.41	31.59	0.77	100
1910/11	17.78	46.56	34.70	0.96	100
1911/12	17.71	46.36	34.66	1.27	100
1912/13	15.34	52.46	30.96	1.24	100
1913/14	18.15	49.58	31.87	0.40	100
1914/15	27.96	55.68	16.26	0.10	100

What has been said of Berlin applies more or less to all the street railway systems in Germany. In fact, the calamity is more marked in the provinces, where the raising of the fare has resulted in a much more pronounced decrease of traffic. Many of these roads are already bankrupt, and during the last two months ten have ceased operations. The Government has issued orders that companies intending to shut down must give four weeks' notice and show proof of necessity, but the order has only theoretical force, as all abandonments which have taken place so far have been caused by the most imperative circumstances.

The same difficulties prevail in Austria and Hungary, but to an even greater extent. In Vienna, where the road is operated by the municipality, the fares have been raised from 20 hellers to 3 crowns, or 15 times the pre-war rate, yet the system is being run at a loss, which has to be made up from taxes. In Vienna for each of the four years ended June 30, 1916, to 1919, there was a continual increase in passengers per car-mile as follows: 5.4, 6.7, 8.5, 10.2.

Prior to the war the electric roads, taken as a group, paid only moderate dividends, though the supposed regularity of their business tended to give their securities an investment character. The accompanying table, compiled by Prof.-Dr. F. Helm, gives statistics as to dividends of the German roads for the years 1907-08 to 1914-15 inclusive.

There has been a diversity of practice in recent years as to the municipalization of these systems. In some cases the city has taken over the railway entirely. In other cases it has acquired a controlling stock interest. The opposite tendency is shown in Düsseldorf, where a municipal railway has recently been leased to a private company.

In fact, with the concessions which the authorities have obtained from the companies in the past, there seems to be little reason for public operation. These concessions have included free transportation of municipal employees and considerable street paving and street cleaning. In addition, fares and service have been closely regulated. In these circumstances it has appeared wise in most cities to go slowly about taking over the properties, as thereby they run a large risk without hope of much reward.

Obedience to Rules Means Safety

THE current issue of the *Utilities Mutual Protection* contains the following safety story:

A baggage car on a single-track interurban road, running westbound as an extra, was scheduled to meet an approaching passenger train at a regularly scheduled siding. While waiting on the siding for the meet to be completed, the passenger car also scheduled to make the meet pulled into the siding behind the baggage car extra.

It so happened that the extra had not pulled far enough into the siding to enable the passenger car to clear the main line. The motorman of the "regular" blew two short blasts on his whistle with the intention of asking the baggage car to move up a little to permit him to get his car "in the clear."

Instead of interpreting this signal correctly, the crew on the extra thought that it meant that the scheduled "meet" was annulled and pulled out onto the main line for the next siding, with the result that a most distressing head-on collision occurred. Four persons were killed, one of whom was the motorman of the baggage car extra, and forty other persons were injured.

The motorman responsible for the accident had been in the service eighteen years and had a splendid record. Nevertheless, if he had followed the rule not to deviate from the printed schedule without orders from the dispatcher, or if he had remembered that one crew could not receive dispatch orders, indirectly, from another crew, this disaster would have been avoided.

Progress on the St. Gotthard Electrification

A REPORT from Switzerland indicates that the electrification of the St. Gotthard line is progressing favorably and trial trips will soon be made on the Airolo-Biasca section. At Bellinzona the railroad station is being remodeled and other building operations are well along. As soon as these are finished the Biasca-Bellinzona section can also be operated by electricity.

At Bellinzona, also, a workshop for the repairing of electric locomotives is nearly finished. This is an imposing building, 328 ft. long, and it is completely equipped to accommodate from twelve to fifteen electric locomotives on three tracks at one time. Two electric cranes, with a lifting capacity of 80 tons each, are installed.

Letters to the Editors

Car Operation from the Motorman's Standpoint

SAN FRANCISCO, CAL., Feb. 3, 1921.

To the Editors:

You may be interested in the views of a motorman in regard to the prevention of accidents on a street railway. The essentials are a loud-sounding gong, plenty of sand and well-equalized brakes. I have prevented many accidents by having these, and accidents have occurred with me on account of failure of gong, sander or brakes to operate properly. A motorman having an accident on account of a poor gong, shortage of sand or unequalized brakes will not so state in his report because he knows that such a report may be used against the company and at the same time he will be cutting his own throat.

Many motormen will not report defects on the defect card as they should; one leaves the reporting to the next fellow, until possibly the defects are not reported at all. Then again reporting such defects may produce no result. Perhaps the shopman willl get on the car in the carhouse and jump on the gong with such force as to produce a loud sound, saying that it is "O.K." Or if the motorman sets down "unequalized brakes" on the card, the first thing the shopman will say is: "He doesn't know what he is talking about." Probably the shopman will check up the piston-rod travel, then take up a little on the slack adjuster and let it go at that.

It is a pleasure for a motorman to run a car which is in good order, but torture to run one with a poor gong and poor brakes, especially in a congested district with fast running time. From my experience of working for a company with slow running time and another with fast running time, I had fewer accidents in the eight and one-half years with the latter than I had in the one and one-half years with the former. With slow running time one is moping along, his mind maybe a thousand miles away from his work, or perhaps on family troubles, or a sick wife or babies, etc. With fast running time his mind and hands are always ready for action. When passing a cross street he is continuously ringing his gong and is on the lookout for something to pop out in front of him, whereas when going slow he mopes along, not even ringing his gong.

There should also be better co-operation between motorman and conductor in starting their car. You often hear a motorman say: "I have the slowest conductor on the road," but often it is the motorman's fault that the conductor is slow. For instance, take a motorman who only knows how to use two points on the controller (full series and full multiple). Now if an old man or lady, or a lady with a baby in her arms boards the car, the conductor, knowing his motorman, does not dare to give the starting signal until the passenger is safely seated. But if this motorman is in the habit of starting his car smoothly the conductor will feel safe in giving the starting signal when the last passenger is up on the platform, and the car will be promptly under way, saving time, preventing accidents and insuring the good will of the public.

JOHN JOHNSON, Motorman.

Capital Must Be Attracted to Electric Railway Industry

SOUTHWESTERN ELECTRICAL & GAS ASSOCIATION

DALLAS, TEX., Feb. 7, 1921.

To the Editors:

Referring to the article by Hon. Edwin F. Sweet in the issue of the ELECTRIC RAILWAY JOURNAL for Jan. 22, it seems to me that certain statements made by him should not be allowed to pass without protest.

In one place Mr. Sweet states: "The principle underlying the street railway industry and all other public utilities should be public service and not private profit. This sounds like a truism. Almost any one would say, 'of course,' yet it is an astounding fact that heretofore and for the most part at the present time, service to the public has been and is subordinated to the pecuniary interests of the corporations owning and operating the street railways." Taken literally, this would leave the inference that "the corporations owning and operating street railways" had, without regard to the comfort, convenience or safety of the public, made full, or even excessive, profits from their operation. The commission and judicial records of the past five years prove conclusively that this has not been the case. These corporations are, at this minute, only asking for a "reasonable return" for the future and do not ask that this be made retroactive during their compelled loss-period.

Regarding forcible arbitration between employer and employed in utility service, Mr. Sweet says: "This recognizes the principle that the primary purpose of street railways is not to afford opportunity for the investment of capital and not to provide work for empleyees, but for the benefit of the public, whose interest is paramount."

This is true, in both theory and practice, in a *publicly* owned and operated utility, but, as a theorem, or a corollary, for the practice of *privately* owned and operated utilities it not only "puts the cart before the horse" but it deprives the cart of any motive power at all. The basic principles and laws underlying all commercial businesses from the peanut stand to the so-called "steel trust" are equally as forcibly applicable to the utility business. Even if the utility is allowed a slightly "*un*reasonable return" on its invested capital it is not best, either for itself or its public, to put its profits back into the business for the purposes above stated. The necessary money for these enforced needs must be "new money," additional and permanent capital, if the general public is to be best served. And such money, like the electric current, takes the path of least resistance; in other words, the path of the least risk, other conditions being equal.

Even in war-time in our country it was not possible to force capital into channels in which it did not ordinarily wish to flow; it took the personal stimulus of patriotism to make it do so. Now capital once more follows that path of least resistance. The fact stares us in the face that without the "primary purpose" of profit to capital invested in the utilities there would be fewer of them and those that were left would not even be able to continue their present admittedly inadequate service.

This is equally true of the other matter which Mr. Sweet discusses, namely, the flow of labor. An attempt to enforce wages or conditions which would be unjust on utility labor, especially on that of the major portion of those employed on street railways, would be very unsatisfactory, and if such an attempt were made the utilities and their service—and consequently the general public—would soon find the evil effects of such "forced arbitration." Labor is not as fluid as capital, and it might be slower in "finding its level," but the inevitable result would be that the utilities would be undermanned, or inefficiently manned.

Any utility owner or operator with any public utility sense at all acknowledges the fact that the public *is* entitled to "100 per cent local" service; that is, to a service which keeps up with, and forestalls the community growth. But the "electric plant" is not a money-tree whose boughs may be shaken at will and dollars drop into the owner's palm. Owners and operators know that, "other things being equal, the right of the public to 100 per cent local service is paramount" but, unluckily for the theory, "other things are seldom equal," capital must be had; it will not come unless the proper bait is used, and that "bait" is a profit commensurate with the risk, for the commercial apothegm of the ages has been "the risk measures the profit."

To give the increased and improved service the public is now demanding, the utility business must have new and abundant capital at reasonable rates of interest or return. To obtain this capital the industry must be made attractive to capital. To make it so attractive the risk and return must be on a par with any other legitimate and successful manufacturing and distributing business in the same community.

It is largely the fault of both consumer and general public that the utility business is, as a whole, in its present condition of financial starvation. It is true that this condition is one where ignorance of the utility business and its financial needs has been, and still is, a great factor in the stand which the public makes. It is equally true that a large portion of this ignorance is the fault of the utility in not only leaving the public unenlightened as to its business and its needs but, also, in persisting in false financing with "major" securities, in trying to lift itself out of the slough of impecuniousness by its bootstraps, but any such recriminations at this time lead us nowhere. "It is a condition and not a theory which confronts us"; the utilities need money; to get it they may have to be less regardless of the theoretical "rights" of the public than that public demands but—they need the money and they need it so that the public may have those "rights" in full as soon as possible! That's all there is to it and premature insistence on those rights and premature efforts to enforce them will only make the matter worse and put off to a later day that which would come sooner if the general public and its exponents would not endeavor to do the impossible, namely, demand of the utility now that which is financially impossible at this moment and an attempted enforcement of which demand will prevent the granting of that demand now or in the near future.

H. S. COOPER, Secretary.

According to plans of the Bradford (England) Tramways Committee, application will be made to the Ministry of Transport for permission to extend the trolley-bus system in that city, involving substitution of this type of rolling stock for the present street railway cars on certain routes. The plan comprehends the use of the new type of double-deck bus developed locally and a considerable increase in the number of rolling-stock units.

Association News

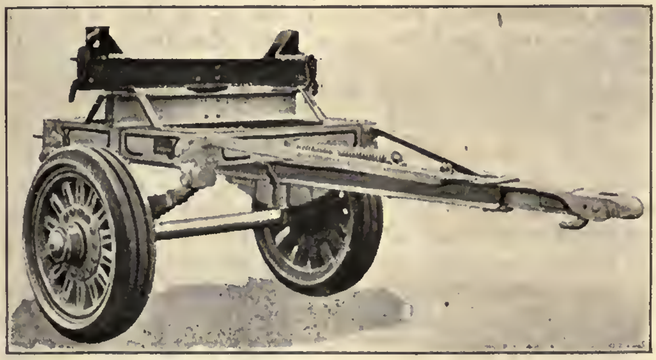
Merchandising Methods Discussed

THE T. & T. Association committee on merchandising of transportation met at association headquarters on Feb. 18, reviewed to some extent the work of last year's committee and mapped out a plan for its report to the 1921 convention. Among those present were J. H. Alexander, Cleveland Railway, chairman; A. H. Ferrandou, Washington Railway & Electric Company; M. B. Lambert, Westinghouse Electric & Manufacturing Company, and E. S. Wilde, Union Street Railway, New Bedford, Mass.

The committee plans to outline, for the benefit of the industry, a number of specific methods that can be used by local companies in merchandising service. These will include plans for education of employees, for advertising in newspapers, on billboards by means of car cards, etc., for direct advertising through addresses illustrated and otherwise delivered before civic bodies and clubs, and for co-operation with national and state publicity bureaus for the dissemination of information for public consumption.

Two-Wheel Trailer Truck

THE Warner Manufacturing Company, Beloit, Wis., has placed a two-wheel heavy-duty trailer truck on the market for the convenience of railways which find it necessary to carry poles, pipes or other material of such a length that they cannot be loaded on standard trucks. The outstanding features of this trailer are the use of a universal ball-and-socket hitch and a swivel bolster. This patented hitch requires no coupling pins. It operates like the shoulder joints in the human body, allowing for all positions of the trailer and the load and eliminating binding in passing over bumps, around corners, etc.



TWO-WHEEL HEAVY DUTY TRAILER TRUCK

The swivel bolsters take care of all side sway and they turn with the load as the truck is rounding corners, so that the trailer wheels will track with the truck wheels. The bolsters are provided with dogs which can be removed quickly if necessary while poles or pipes are being loaded on the truck. The dogs are adjustable in position to accommodate loads of any size. These trailers are made in four sizes, 1¼ tons, 1¾ tons, 2¾ tons and 5½ tons.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Storm and Fire Hit Boston

$400,000 Loss Sustained by Boston Elevated by Destruction of Neponset Carhouse and Cars

Almost on the heels of the announcement by the trustees of the Boston (Mass.) Elevated Railway that the $300,000 deficit of last year might be wiped out in the next six months if the winter should continue as mild as it had been in the early months, a blizzard bringing a 16-in. fall of snow came on Sunday, Feb. 20. Before the storm was over and the streets cleared for vehicular traffic the elevated suffered the most disastrous fire it has had in a number of years, the Neponset carhouse and forty cars being totally destroyed by the conflagration.

COMPANY'S EQUIPMENT IN READINESS

The elevated was well prepared for the storm and early Sunday morning had more than 100 plows operating over the entire system with the result that at no time was any line tied up for more than comparatively short periods. Coming as it did on Sunday, the loss of revenue due to delays of thirty to sixty minutes on various lines was less serious than it would have been on a business day. At no time were the rapid transit lines tied up. On Monday morning all lines were operating on normal schedule except where delays were occasioned by other vehicular traffic using the tracks cleared by the elevated plows.

Although the company probably did not suffer any very considerable loss in revenue, the cost of clearing the snow is expected to cause a very decided setback in the efforts of the trustees to wipe out the past deficits. An unfortunate controversy arose between the city officials of Boston and the company over the clearing of the snow from the streets.

FIRE BREAKS OUT IN CARHOUSE

Mayor Peters charged the Boston Elevated Railway with failure to cooperate with the city in removing the snow from the streets upon which its tracks are laid as required by law. The Mayor issued a statement to the effect that he called the trustees of the elevated into conference and that after some discussion they agreed to make greater effort to secure the removal of the snow over the holiday. The Mayor further stated that the trustees claimed that the financial situation of the company was such that they could not stand the greater expense.

At five o'clock Monday morning a fire, said to have originated in the electric heater of one of the cars, broke out in the carhouse at Neponset, completely destroying the structure. Employees succeeded in running five cars out of the building, but the fire spread so rapidly that the men engaged in the work of rescue were driven out and twenty-three articulated type cars, eight semi-convertibles, one 25-foot motor car, four trailers, two snow plows and two work cars were completely destroyed. Five other cars on storage tracks outside the building were badly damaged but can be repaired.

$400,000 Loss

The loss is estimated at approximately $400,000, but this will be largely covered by insurance. The loss to the company, however, in the use of the cars and the carhouse cannot be estimated at this time. Before the fire was even extinguished, General Manager Edward Dana was on the scene and had emergency crews clearing the loop track and had established an emergency shuttle service between Field's Corner and Neponset.

The fact that the fire started before the streets had been broken through after the heavy snow is believed to have been the reason for the inability to check the fire before it had gone so far. Several pieces of the city fire apparatus were stalled in the snow drifts and never succeeded in reaching the fire.

Home Rule in Arkansas

Public utilities in Arkansas are vitally affected by the Emory-Walls bill. This bill has been passed by both houses of the Arkansas Legislature now in session and has been signed by Governor McRae. It repeals the act of 1919 which abolished the Arkansas Railroad Commission and substituted the Arkansas Corporation Commission. In repealing this act, provision is made for a new Railroad Commission to which certain powers formerly exercised by the Corporation Commission are transferred.

The new commission will have general jurisdiction over all common carriers, railroads, express companies, car companies, freight lines, toll bridges, street railways, electric and other interurban lines, telegraph and telephone companies, etc. No jurisdiction is vested in the commission, however, over any matter of rates or regulations of public utilities operating within a municipality, such jurisdiction being expressly conferred upon the municipality.

Procedure is prescribed whereby municipalities may assume ownership and direct operation of utilities after an election by the people. Provision is made for appeals from the rulings of any municipality in regard to rates or other question to the Circuit Court.

Detroit Campaign Started

Voters Solicited by Private Company to Discard Municipal Ownership for Service at Cost

The initiative petition, in the form of an ordinance to authorize and provide for the operation of one complete unified railway system in Detroit, Mich., under service at cost and reserving to the city the right to purchase or lease the lines, has been filed in the office of the City Clerk by Elliott G. Stevenson, attorney for the Detroit United Railway.

The proposed ordinance has been approved as to form by the Corporation Counsel and has been submitted to the Council by the City Clerk. The ordinance will be submitted to the voters at the election on April 4, and a copy of the settlement plan as set forth in the ordinance is being mailed by the Detroit United Railway to every registered voter in the city of Detroit.

Accompanying the complete copy of the proposed ordinance which is being sent out to the voters is an analysis of it, intended to enable all the people to note how the ordinance meets the various popular demands. The demands of the public are set forth as follows:

1. That the entire street railway system of Detroit be one single system, operated as such, with no stub ends belonging to the interurban lines in portions of the city which have been annexed from time to time, and that the lines in Highland Park and Hamtramck be made part of the Detroit system.
2. A reasonable rate of fare, provided for a continuous ride between any two points in the city.
3. That the rate of fare shall be the lowest possible, sufficient only to give all the service desired by the people and paying only the legitimate and proper costs of that service.
4. City control of routes, frequency of service, heating and ventilation and the like.
5. Prompt extensions of lines as the public needs demand them.
6. That the privilege of municipal purchase shall be reserved to it, in case it desires to exercise it in the future.
7. Full knowledge of street railway finances.
8. Street railway development without continued quarrel.
9. That plenty of capital be available for extension and development.
10. The building of certain lines that by their very nature are piecemeal in their service and by themselves cannot be made to render transportation for all the people throughout the city, has been undertaken by the public.

The analysis explains fully how each of the demands of the public is met by the provisions of the ordinance. With respect to the piecemeal lines, it is stated that the ordinance requires the Detroit Service-at-Cost Railway to purchase these lines, if the city so directs, thus relieving the city from guaranteeing its tax money in a piecemeal undertaking.

The ordinance must receive the approval of 60 per cent of the voters to be adopted.

New Akron Franchise Rejected

Railway Refuses to "Be a Party to Fooling the People," Declaring Results Under Grant Are Impossible

An unusual situation with reference to a new franchise has developed in Akron, Ohio. Following rejection of the franchise by the Northern Ohio Traction & Light Company, the Council defeated the measure. The measure was then reintroduced at a subsequent meeting and passed final reading. Still the company refuses to accept the ordinance, declaring that when a new contract is made the people will expect results, that results cannot be obtained under the franchise as passed, and that "the company will not be a party to fooling the people."

THE proposed franchise is based on the service-at-cost plan. The measure, a summary of which appeared in the ELECTRIC RAILWAY JOURNAL for Nov. 20, 1920, page 1072, as originally presented in Council, was satisfactory to the company. It was amended in Council.

TENTATIVE FRANCHISE ARRANGED

Following a strike of the trainmen on the Akron City lines last July, the company entered into a franchise agreement at a conference participated in by leading citizens of Akron, representatives of the city, including the city administrator, and company representatives. This agreement was to form the basis of a new franchise. Upon the strength of it the company granted its trainmen an increased wage and they returned to work. The agreement provided:

1. That the valuation of the system be fixed by arbitration.
2. That the initial rate of fare be 5 cents until Dec. 15, 1920, then a 6-cent fare; the 6-cent fare to be considered as the basic rate of fare for the entire life of the ordinance.
3. Minimum rate of return on the valuation fixed by arbitration board to be 7 per cent with an increase of ¼ of 1 per cent for each reduction of one step in the fare below the 6-cent rate.
4. If money for capital expenditures cost more than 7 per cent the difference be charged to operating expenses.

This agreement was put in writing and signed July 19, 1920, by F. H. Lyder, William H. Kroeger and George C. Jackson, members of the public utility committee of the Council. It was accepted on July 23 by A. C. Blinn, vice-president and general manager, for the company.

CITY EMPLOYED EXPERT

The city employed E. E. Brownell, a traction expert, and the writing of the new contract began in August. It was submitted in Council on Nov. 9, 1920. Then the politicians got busy. Something like fifty or sixty amendments were offered and some adopted by the Council. Most of them were unimportant, but two changes, one submitted by Mayor Beck and another by Councilman Jackson, a member of the committee signing the original agreement, struck at the very heart of the contract—valuation and rate of return.

The Beck amendment provided that in making the valuation only original installation cost, less depreciation, should be considered by the appraisers. The Jackson amendment provided for a sliding rate of return with a maximum of 8 per cent when fares were 4 cents and 4 per cent when fares were 8 cents.

Before the ordinance came up for second reading Mr. Blinn wrote a public letter refusing to accept the franchise if passed. When the roll was called on final passage Dr. F. H. Lyder, chairman of the utility committee, made public the agreement between the city and company, charged double dealing and by voting no killed the ordinance.

The chief administrator, recognized as a political boss, had the measure reintroduced, "lined up" his followers and on Feb. 15 put the ordinance through final passage by a vote of five to four.

The company and business men who attended the July conference openly charge double dealing on the part of certain city officials, and the public has been informed of all the facts. The *Beacon Journal*, recognized as the administration paper, has pointed out the folly indulged in by the Council and insists that "the people want the matter settled and will accept a franchise based on justice and good business principles." It adds that "the company is objecting to the method of valuation, and we think rightly so." The *Times*, an anti-administration paper, has denounced the city administrator and Council for not settling the question and for what it calls "double-crossing the company and public." The *Press*, opposed to any franchise, is saying nothing.

PUBLIC DEMANDS SETTLEMENT

While all this is going on the city has become thoroughly aroused over the situation. The car riders and builders want the railway system more thoroughly developed. The housing situation in Akron is anything but good, and a committee of the Chamber of Commerce has been working for months on the question. This committee found itself confronted with the fact that the only hope of bettering conditions was to secure railway extensions.

The limit has been reached as to the distance workers will walk to the car lines. Buses were established in some sections, but for the most part they have given up the effort, with the result that there is crowding along or near the car lines.

The old franchise provides for the sale of tickets at six for a quarter, a ten-minute service on all lines from 5 a.m. to 10 p.m. and a twenty-minute service from 10 p.m. to midnight with no service after midnight. The Council granted the company a temporary 5-cent rate. The service furnished is the best in the history of the city, a three-minute headway being maintained on many lines.

The company is also maintaining service after midnight, more than fulfilling the terms of its contract at all times. Many new cars have been purchased and put into the service and there is a general feeling of good will toward the company.

The company agrees that development is necessary and wants to make the extensions, but it declares it cannot unless the contract is such as will permit of the necessary financing—and the people generally agree. The politicians, however, say no.

Seattle Case in Courts

Stone & Webster Demand Payment of Interest and Installment of Principal Be Made

A. W. Leonard, president of the Puget Sound Power & Light Company, Seattle, Wash., representing Stone & Webster interests, on Feb. 21 filed two suits in the United States Court at Seattle. One complaint petitions the court to prevent the city treasurer, city comptroller and city of Seattle from using any portion of the gross revenues of the municipal street railway system, purchased from Stone & Webster, for any other purpose until after payment has been made of interest and installment on the principal of the $15,000,000 of bonds issued by the city to Stone & Webster interests when the city took over the railway and to compel specific performance of the contract. The other suit seeks to restrain taxpayers or any one else from prosecuting action in the Superior Court that would force the city to breach its contract and default the bonds.

Judge Jeremiah Neterer and Judge Edward E. Cushman of the United States Court signed a temporary restraining order, returnable on Feb. 28, enjoining the taxpayers from taking action in the Superior Court to prevent the payment of interest and principal. Stone & Webster interests represented in their complaint that they had not been made a party to action now pending in King County Superior Court and therefore could not protect their interests. The city of Seattle's motions and demurrer in the taxpayers' suit to protect the general fund from invasion by the railway is pending before Judge J. T. Ronald, in the Superior Court.

The motions to be disposed of are to require the taxpayers to state their separate causes of action and to require them to cite the Puget Sound Power & Light Company as a co-defendant with the city. The demurrer questions the jurisdiction of the court, and raises other technical objections to the proceedings. With Judge Ronald's opinion handed down, main action in the Superior Court will be taken up with argument on the regular "show causes" calendar.

In a suit filed Feb. 11 in the King County Superior Court the city of Seattle, Wash., has been enjoined from setting aside any receipts from the municipal railway to pay interest on the $15,000,000 of bonds issued in payment of the railway property. The restraining order was issued by Judge King Dykeman on the plea of fourteen prominent business men and taxpayers.

The order is directed against the city and City Treasurer Edward L. Terry and City Comptroller Harry W. Carroll. It is action counter to this suit that has now been brought by Mr. Leonard.

NEW MOVE EXPECTED TO FORCE REVIEW OF TRANSACTION

The action prevents the piling up of money in the special interest fund, from the revenues of railway, for the benefit of the bondholders. It is expected that the new move will force a review of the entire transaction in the light of the facts as developed during the period that the municipality has been operating the lines.

The complaint reviews the transactions leading up to the acquirement of the property by the city, and quotes voluminously from the ordinances passed by the city.

The present fare is declared "as high a rate as is practical" and the assertion is made that "at the time of the transfer the roadbed, tracks and rolling stock were in a depreciated, run-down and out-of-repair condition."

The diversion of money from the general and other funds for the payment of interest on the utility bonds of the railway system is attacked as illegal.

Muddle Results from Ousting of New Jersey Commissioners

As a result of the decision of the New Jersey Court of Errors and Appeals on Feb. 15, sustaining the judgment of ouster issued by Governor Edwards against the members of the Public Utility Commission, the state will continue without a utility board until the Senate confirms a new board nominated by the Governor, or the Legislature enacts a new law creating a new commission. The ousting of the commissioners ends a long and bitter fight against the board. Removal charges against members of the board were brought during the term of Governor Runyon. After a hearing he dismissed the complaint on the ground that the case against the board was not proved.

The whole utility question was an issue at the last general election in New Jersey. It was on the charge made by Jersey City of misconduct in office and neglect of duty that Governor Edwards dismissed the entire board. The outsted commissioners appealed the Governor's judgment to the Supreme Court, which sustained the Governor. An appeal was then taken to the Court of Errors and Appeals.

Senator Johnson in New York Fight

Retained to Represent City Before the Legislature—Important Constitutional Questions Involved

Hiram W. Johnson of California has been retained by the city of New York, through Mayor Hylan, as special counsel to assist the city administration in looking after its rights in connection with the transit relief legislation introduced at Albany at the behest of Governor Miller. Senator Johnson has accepted the retainer in what he terms "the old, old fight with special privilege and exploiting corporation greed." The announcement of the appointment, made by Corporation Counsel O'Brien, was the most important news development in the transit fight in the last week.

IN VIEW of the backing which Senator Johnson has received from the Hearst papers in the past the impression was quick to spread that Hearst had had a hand with Hylan in securing Senator Johnson as adviser. This the Hearst papers deny. Many there are, however, who see a political plot with deep motives in the retention of Johnson, the Republican, former Progressive and arch enemy of "special privilege," as he is wont to term it, to fight the Republican Governor of New York.

Mr. Johnson in accepting the retainer is the old Johnson, the Johnson who drove the Southern Pacific out of politics in California. He said that he knew the "money power" would be arrayed against him on the other side, but "we are used to that." He expects to "go to the bat in this case," as he terms it, at the public hearing at Albany on March 2.

It was Hiram Johnson who drove the Southern Pacific Railroad out of politics in California. It was he who at San Francisco stepped into Heney's place as prosecutor when the latter had been shot in court in the graft trials and then brought about the conviction of Abe Ruef, San Francisco's labor Mayor. It was he who spurred the California Legislature into extending and widening the scope of the California Railroad Commission, now one of the most progressive and fearless bodies of its kind in the United States. And so it goes. Johnson may have an eye to the main chance, but those who take issue with him know before they are through that they have had a fight on their hands.

The impression is wrong that Johnson was the sponsor of the San Francisco Municipal Railway. He did not figure in the establishment of that line. This was a hobby of Mayor Ruef during his first administration in 1913, when the city took over the old Geary Street Railroad at the expiration of its franchise, scrapped the equipment and built a new line. Johnson was never identified with the enterprise, although he did lend aid to it as Governor.

Senator Johnson's formal acceptance came in the form of the following telegram to the Corporation Counsel:

> I am very glad to undertake the employment as special counsel in the endeavor to protect and preserve the city's rights from the assault now being made upon them. I congratulate the Mayor and you and the other city officials upon the valiant struggle you are making.
>
> I recognize the odds in the contest and the tremendous opposition and difficult obstacles which must be encountered, but it's the old, old fight with special privilege and exploiting corporation greed on the one side and the simple justice and inherent rights of the mass of the people on the other. You are fighting the good fight and I am delighted to be a part of it with you.

In explaining the retention of Mr. Johnson, the Corporation Counsel said:

> Inasmuch as the traction interests intend to have abrogated the 5-cent fare contracts existing between the city and the traction corporations by legislative enactment at Albany, which has for its purpose, by nullifying and setting aside contracts at will by State officials, an increase in fare, extracting between $60,000,000 and $100,000,000 yearly out of the pockets of the people; and, inasmuch as the abrogation of solemn contracts, against the people's interests, and in favor of powerful corporate interests, goes to the very vitals of constitutional government, and has a bearing on every contract made in the United States under our constitutional form of government, it behooves the Mayor and the Corporation Counsel of this city to use every means at their command to uphold the solemn agreements made with the people of this city by the traction interests, and protect the people from being compelled to pay additional millions yearly to these interests.

The Governor's comment was:

> Is there so little talent in support of their side of the proposition that they have to go to California for it? I thought they were opposed to outsiders interfering.

Several of the newspapers, in their editorials, reiterated this question.

Sponsors of the legislation fostered by Governor Miller announced on Feb. 21 that the new measures would be amended so that no fares would be increased pending adoption of the plan for a unified city-owned transit system in New York.

Nineteen States to Attack I. C. C.'s Control of Intrastate Rates

Nineteen states will join with Wisconsin in challenging before the Supreme Court on Feb. 28 the right of the Interstate Commerce Commission to regulate state railroad rates under the transportation act.

In a formal statement the Attorney Generals of the states said it had always been a constitutional right of the people of the several states to control purely state traffic, adding that this principle had been upheld by John Marshall and uniformly admitted by all the courts up to this time.

The provision of the transportation act that the Interstate Commerce Commission fix a return without regard to the value of service rendered is "not only economically unsound, but it is violative of fundamental law," the statement declared. Under the group plan of fixing aggregate values, it was contended, weak roads had the right to earn on their own value and on the value of the other roads as well.

Safety Car Invades Chicago

Safety cars made their bow to the Chicago public on Feb. 18. On that date the Chicago Surface Lines began operation with three "safeties" on West Division Street, a 2-mile route, where they were added to the service given by an equal number of double-truck cars. This is a temporary arrangement, it being planned eventually to operate the entire line with safety cars. The West Division Street line is comparatively new and serves a fast growing population. The traffic is mostly short haul and it is expected that a number of people in that vicinity who have been walking to their destinations will ride with the service increased to this point. The Surface Lines has ten standard safety cars, but schedules have not been prepared for the complete installation of equipment of this type.

Wages Increased in Louisville

The Louisville (Ky.) Railway has announced an increase of 3 cents an hour in the wages of all employees, effective simultaneously with the increase in fares, referred to elsewhere in this issue. Last October the company told the Welfare Association plainly that increased wages were impossible without increased fares. The men remained loyal, and the company has kept its promise of increasing wages if fares were increased. J. P. Barnes, president of the railway, has stated that the fare case will probably be fought through the higher courts, but he felt that the increase would stick. If it does not wages will have to be readjusted. In the meantime 1,400 men are affected by an increase of about $165,000 annually in the payroll. Present wages paid the men range from 41 to 45 cents an hour.

City of Chicago Renews Attack

On Feb. 17 the city comptroller of Chicago refused tentatively to accept a check for $87,090 offered by the Chicago Surface Lines to settle a balance of disputed bills including payment for cleaning the right-of-way. The city law department advised the comptroller not to accept the check for the present because by doing so he would recognize the existence of the ordinances which the city claims have been canceled by the action of the companies in accepting a rate of fare higher than 5 cents. Under these ordinances the companies are required to pay the city about $348,000 a year for street cleaning which is to be done by the city. The question has been raised as to who would remove snow after a big storm in the event that the city persists in such refusal. As has been indicated previously in the ELECTRIC RAILWAY JOURNAL Mayor Thompson has called upon Bion J. Arnold to relinquish his title as chairman of the Board of Supervising Engineers on the ground that the Surface Lines' franchises have been canceled and the board has no authority to function.

News Notes

Wages Reduced on Michigan Railway.—The Michigan Railroad, Jackson, Mich., on Jan. 1 reduced the wages of line foremen from $175 to $150 a month. The wages of other linemen were cut $20 a month, from $150 and $140 a month to $130 and $120. The wages of all shop men were cut 10 cents an hour, and a similar reduction made for all freight men. On Nov. 15, 1920 all track laborers were reduced in pay from 65 cents and 60 cents an hour to 40 cents an hour.

Official Denial of Wage Reduction.—H. B. Titcomb, vice-president of the Pacific Electric Railway, Los Angeles, Cal., has published a statement in refutation of persistent rumors to the effect that the Pacific Electric Railway was considering a reduction in the wage scales of the working forces. He said: "We have not considered making any reduction in the wage scale of any of the employees of the Pacific Electric. Neither is there any basis for a report that we are planning any reduction other than normal fluctuation in the working force."

Further Motor Bus Service Proposed.—Plans for the establishment of additional motor bus lines in Chicago were made known recently through a petition filed before the Illinois Public Utilities Commission by the Depot Motor Bus Lines, Inc. This concern has for several months past been operating a few buses between one of the downtown department stores and the Union and Northwestern railway stations. It is now proposed to establish seven main routes which would serve districts on the far south side, the west side and the stock yards territory. W. T. Gridley is vice-president and general manager of the corporation. No date has been set for hearing on the petition. The Chicago Motor Bus Company has been operating since 1917 on the north side and has been delayed in its plans to extend service to the south side.

Commission Insists Its Own Act Shall Be Investigated.—No action has been taken on a bill introduced by Delegate J. B. Hilleary, of Upshur County, and upon measures of a similar nature introduced by other members of the Legislature of West Virginia growing out of public dissatisfaction with increases allowed to public utilities and particularly gas companies, but a committee has been named by the Legislature to inquire into the manner in which the Public Service Commission has discharged the duties imposed upon it by law. The committee, however, was named in a resolution adopted upon the insistence of the commission that its official acts be reviewed by a committee of the Legislature, that request having been transmitted to the Legislature by Governor Cornwell.

Eight Die in Accident.—A head-on collision between a Bridgeport and a Shelton electric car near Shelton, Conn., on Feb. 22 resulted in the death of eight persons, among them the motorman of the Bridgeport bound car. Many severely injured were removed to a hospital and several suffered minor injuries. The accident occurred when the two cars running at high speed met 100 ft. south of a 90 ft. trestle. With windows smashed and glass flying in all directions a panic ensued. Men and women who were able to extricate themselves from the wreakage fell down the adjacent embankment. The disastrous trip was the first over the Bridgeport-Derby route since the block caused by the recent snowstorm. It was said that when the cars telescoped a can of gasoline on the Bridgeport car exploded.

Court Demands Retraction.—Comptroller Charles L. Craig of New York was recently found guilty of contempt of court by United States Judge Julius M. Mayer. This decision was reached as a result of a communication written on Oct. 6, 1919, by the comptroller to Public Service Commissioner Nixon in which the former made a statement to the effect that federal jurisdiction blocked access of city authorities to reviewing reports and statements of the Brooklyn Rapid Transit Company and the New York Railways receiverships. A few days after the writing of the letter United States Attorney Francis G. Caffey filed a charge against the comptroller. The court considered the charge a grave one. It said that "the undisputed testimony shows that neither the defendant nor any official or representative of the municipal government ever applied directly or indirectly to Receiver Garrison, Hedges or Trustee Sheffield to have access to any papers, documents or information." Judge Mayer will allow reparation in the form of a retraction filed with the clerk of the court.

Program of Meeting

Oklahoma Utilities Association

The third annual convention of the Oklahoma Utilities Association will be held at the Huckins Hotel, Oklahoma City, Okla., on March 8, 9 and 10, 1921.

It is expected 300 or 400 delegates and visitors will attend and to have a large number of exhibits.

Noted speakers will be on the program. Among those who will address the convention are:

H. J. Gordon, publisher *Public Service Magazine*, Chicago, Ill.; H. P. Wright, president H. P. Wright Investment Company, Kansas City, Mo.; Paul P. Haynes, member Indiana Public Service Commission; C. C. Deering, secretary U. S. Independent Telephone Association, Des Moines, Ia. There will be a banquet on the night of March 9.

Financial and Corporate

Winnipeg Earnings Improve

Net Profit of $600,000 Best Showing Since 1914—Management Complimented on Excellent Record

Gross earnings of the Winnipeg (Man.) Electric Railway for the year ended Dec. 31, 1920, show an increase of $949,221 over the previous year. Notwithstanding the large increase in wages and other operating expenses, the net income shows an increase for the year of $498,720. After paying all fixed charges and making provision for depreciation amounting to $201,050 the company made a net profit of nearly $600,000. This is substantially the best showing of any year since 1914.

EARNINGS SPEAK FOR THEMSELVES

The statement of earnings of the company as made public at the annual meeting on Feb. 9 follows:

Gross earnings from operations..........		$5,233,700
Operating expenses, before charging depreciation..........................		3,428,897
Net operating revenue..................		$1,804,803
Miscellaneous income..................		76,700
Income available to meet fixed charges, etc..................................		$1,881,503
From which the following deductions are made:		
Interest charges on debenture stock, bonds, gold notes, etc......................	$716,214	
Extinguishment of discount on securities..............	26,786	
City percentage and car license taxes..............	181,249	
Taxes	127,239	
Miscellaneous non-operating expenses..................	2,942	
Other income deductions.....	30,495	1,084,928
Net income as shown on accounts submitted herewith, excluding depreciation		$796,575
Deduct:		
Depreciation............................		201,050
Net income transferred to surplus.........		$595,525
Surplus brought forward from 1919 as adjusted..............................		1,314,420
Net income for year transferred..........		595,525
Dividend on 7 per cent cumulative preferred stock........................		4,444
Sinking fund appropriation..............		60,000
Surplus carried forward...............		$1,845,501

In July a board of arbitration awarded increased wages to the company's employees retroactive to May 1. As a result of the company's application to the Manitoba Public Utilities Commission increased rates were granted and an appraisal of the physical value of the company's property was arrived at. The increased rates and fares authorized assisted in offsetting the increased operating expenses which had resulted from the rising costs of material and labor.

In April last the company's south Main Street carhouse, together with twenty-one cars and other equipment, was destroyed by fire. A new fireproof, fully modern carhouse has been erected on the site of the old one and all rolling stock destroyed has been replaced. More than $300,000 was recovered from insurance.

The company made improvements in all departments during the year to the extent of more than $900,000. This sum included expenditures for replacing property destroyed by fire.

For the purpose of retiring as far as possible the company's floating liabilities a new issue of preferred and common shares was authorized. This stock is now being placed on the market.

FUTURE OUTLOOK VERY BRIGHT

A. M. Nanton, president of the company, presented the report at the annual meeting on Feb. 9. The property is in direct operating charge of A. W. McLimont, vice-president. When Mr. McLimont took over the property in October, 1917, a stupendous task confronted him. Jitneys were on the streets, the property was run down, the company was in bad public repute, franchise fares existed and there was considerable litigation pending between the company and the city. At the present time the jitneys are off the streets, almost the entire property has been rehabilitated and negotiations are proceeding with the City Council with a view to effecting a service-at-cost franchise, toward which public sentiment is very favorable.

The system at Winnipeg comprises 112 miles of track, with more than 306 cars.

Reorganization of Bus Companies Completed

The reorganization report on the American Motor Bus Corporation and the Chicago Motor Bus Company, submitted by Harold Almert, consulting engineer, Chicago, has been adopted by the bankers, and the business of the two concerns taken over by the Lake Shore Motor Bus Corporation, a holding company.

The American Motor Bus Corporation, the manufacturing concern, has resumed manufacturing with an initial order that will keep the factory operating at full capacity for the year 1921.

The Chicago Motor Bus Company, which operates a fleet of motor buses over the boulevards of the north side of Chicago, serving a territory which cannot be reached by the surface and elevated railways, has obtained an amendment to its franchise permitting the operation of the new enclosed top bus. The company will increase its service on the north side and shortly start operation on the south side, together with through routes between the north and south sides.

Chicago capital has taken over the entire interest of New York capital, which retires from the field.

Mr. Almert has been retained as consultant by all three companies.

$8,559,776 Grand Rapids Value

Reproduction Cost, Less Depreciation, Fixed at This Amount in Franchise Case

After many months of constant work the valuation of the property of the Grand Rapids (Mich.) Railway has been completed. The inquiry was conducted for the purpose of establishing a rate basis for fare in a new service-at-cost franchise to be offered the company as a temporary operating arrangement.

THREE SETS OF FIGURES PRESENTED

The valuation has been completed on a three-fold basis, historic, five-year average and replacement. These three bases were arrived at by co-operation between the company's engineers, headed by W. L. Hagenah, and the city's engineers. A short conference was held on Feb. 17 and the going value decided upon. The reports were then presented to the City Commission.

The historic value of the company's physical properties was $4,468,360 without depreciation. With depreciation it was fixed at $3,610,526. To these amounts must be added a material and supplies account of $131,812 and a working capital of $107,040. The figures of these items are the same for all three valuations. The going concern value, which is not admitted by the city as belonging in the appraisal for rate making purposes, is placed at $357,469 in the historic valuation. Property not used and useful and miscellaneous property is listed at $12,200. This makes the total historic valuation of the railway company's lines without depreciation $5,076,881 and depreciated, $4,219,047.

The five-year average valuation, from 1915 to 1919, of the physical properties is $6,718,463 without depreciation and $5,385,102 with depreciation. After adding the fixed material and supplies and working capital together with the going concern valuation of $537,477 and the physical property useful but not used, the total five-year valuation of the company is $7,506,992. Depreciated this figure stands at the sum of $6,073,631.

DEPRECIATED FIGURE $8,559,776

The reproduction valuation, which the company insisted would be taken together with the other valuations, is $10,591,414 without being depreciated. This valuation includes the physical property of $9,574,409; the fixed material and supplies and working capital and a going concern value of $765,953, together with the $12,200 item for extra property on hand. Depreciated this figure stands at $8,559,776.

As indicated at the outset of this article Grand Rapids is working toward a trial of service-at-cost for a year, with a view to its permanent adoption. The situation there in connection with the negotiations along these lines was reviewed briefly in the ELECTRIC RAILWAY JOURNAL for Jan. 29, page 235.

Prompt Action Urged

Ontario's Railway Board, Operating London Street Railway, Sees Need of Aid for Company

The Ontario Railway & Municipal Board, which assumed operating control of the London (Ont.) Street Railway on June 15, 1920, after two strikes within a brief period had left the city without service for thirteen days, has reported as follows for the year ended Dec. 31, 1920:

	Operation By L. S. R. to June 15	Operation By O. R. B.	Total for 1920
Gross earnings	$225,205	$299,523	$524,728
Operating expenses:			
Maintenance	41,933	61,209	103,143
Transportation	153,170	198,243	351,413
Totals	$195,104	$259,453	$454,557
Net earnings	$30,100	$40,070	$70,170
Interest on bonds and loans and taxes	17,034	20,386	37,421
Balance	$13,066	$19.648	$32,749
Depreciation, invested in bond redemption	$13,768	$19,500	$33,268
Net deficit of company	$702		
Net incnme of railway board	....	$183	

In urging an early settlement of the higher fares dispute the board reminds the City Council as follows:

> It is not contemplated by the act under which the board is in possession of the railway that the board's possession and operation would be a permanent solution of the difficulties under which the city's transportation system labors. In the very nature of things the board, in view of the statutory limitations on its powers and its inability properly to finance such an undertaking, is unable adequately to provide for the inevitable wear and tear and depreciation of the plant; much less is it able to meet the probable demands for the improved service and extensions certain to arise in a growing community like the city of London.

The board emphasizes the "urgent need for prompt action looking to some workable solution." It is shown that the two strikes last June cost the company $2,717 and the strikers $12,870 in wages.

The company formerly raised substantial amounts of new capital from year to year to provide for improvements, but when dividends ceased such financing was impossible. A statement shows that no new capital has been secured since 1918. The effect of the present condition upon expenditures for improvements was noted at once. In 1920 none were made.

Secretary-Treasurer Leonard Tait's analysis asserts:

> The question of whether or not the road is privately or municipally operated in the future will be an ever-present one. Municipal ownership is urged by some as a panacea against increased fares. It does not matter by which plan the railway is managed, the cost of the service must be found either from those who use the cars or by taxation.

Between 1915 and 1920 wages increased $147,133 and other operating expenses $12,757, a total of $159,891. The total increase in earnings in the same period fell $34,021 short of this amount. The statement, it is pointed out, "shows conclusively the difficulty in operation to be a question of wages."

In an endeavor to keep operating costs down the Railway Board cut the service, and the year's car mileage decreased to 1,765,242 miles as compared to 1,918,207 in 1919. Gross earnings per car-mile advanced from 20.49 cents in 1915 to 29.73 cents, but net earnings decreased from 5.35 cents to 3.98 cents. Passengers carried totaled 10,801,531 in 1915, 13,689,732 in 1919 and 13,788,209 in 1920.

Foreclosure Step Taken

As a further step in the reorganization of the United Railroads of San Francisco, Cal., the Union Trust Company, as trustee, has commenced foreclosure proceedings against the railway in the Superior Court. This move was made in accordance with the working out of the reorganization plan recently approved by the State Railroad Commission. The reorganization of the United Railroads should be completed and the new securities issued within sixty days, according to Frank D. Madison, of Pilsbury, Madison & Sutro, and attorney for the reorganization committee. The Market Street Railway is now being recapitalized preparatory to its taking over the properties in accordance with the reorganization plan.

Boston "L" Lost $346,951

Trustees Feel Confident Receipts for Coming Six Months Will Exceed Cost

For the year ended Dec. 31, 1920, the receipts of the Boston (Mass.) Elevated Railway failed to meet the actual cost of the service by $346,951. Adding to this latter amount the current deficit of $23,659 existing on Dec. 31, 1919, makes the present deficit from current operations $370,610. This amount must be absorbed during the six months ending June, 1921, in order that there be no deficit to be assessed against the public on that date.

The board of trustees feel confident, however, that this will be accomplished and that the receipts during the coming six months will exceed the cost of the service by an amount which will also permit of absorbing in part, if not entirely, the $435,348 charge for the back pay applying to the months of May and June, 1919, which has not yet been provided for.

The extraordinary expense of $615,548 on account of the severe snow storms is nearly twice the net deficit. The coal situation in New England was another factor in causing the deficit last year, an average price of $10.07 for the 258,087 tons of coal used being responsible for an usually high total cost of power. The details of the earnings are shown in the accompanying table:

RECEIPTS AND COST OF SERVICE OF BOSTON ELEVATED RAILWAY FOR YEAR ENDED DEC. 31, 1920

Receipta		
From fares		$33,096,764
From operation of special cars, mail pouch service, express and service cars		105,961
From advertising in cars, on transfers, privileges at stations, etc		300,228
Frnm other railway companies for their use of tracks and facilities		40,703
From rent of buildings and other property		100,499
From sale of power and other revenue		106,707
Total Receipts from direct operation of the road		$33,750,862
Interest on deposits, incnme from securities, etc		280,774
Total Receipts		$34,031,636
Profit and loss, delayed items		215
Cost of Service		$34,031,851
Operating Expenses:		
Maintaining track, line equipment and buildings (including $615,548.70 snow expense)		3,209,276
Maintaining cars, shop equipment, etc		3,011,850
Power (including 258,087 tons of coal at $10.07, $2,597,652.93)		3,603,992
Depreciation		2,004,000
Transportation expenses (including wages of car employes, car house expenses, etc.)		11,528,181
Salaries of administrative officers		80,059
Law expenses, injuries and damages, and insurance		1,194,762
Other general expenses		1,137,002
Total operating expenses (of which $17,216,445.20 wages)		$25,769,122
Taxes, proportion		1,142,987
Rent for leased roads (exclusive of subways)		2,638,562
Proportion of rent of subways and tunnels, to be paid to the City of Bostnn		1,537,919
Interest on B. E. bonds and notes		1,494,795
Miscellaneous items		59,068
Proportion of dividend rental under Acts of 1918		1,463,668
Proportion of rent of Cambridge subway to be paid to Comm. of Mass		252,513
Interest on unpaid taxes		20,169
Total cost of service		$34,378,803
Net loss		$346,951
Revenue passengers	335,526,561	
Receipts per revenue passenger	10.143 cents	
Cost of service per revenue passenger (of which labor cost 5.131 cents)	10.246 cents	

New Orleans Still Floundering Around for Railway Solution

The railway problem at New Orleans, La., appeared on Feb. 19 no nearer solution than it was before the advent of the investment bankers of the East and the submission of the service-at-cost plan of Receiver O'Keefe, approved by the representatives of the security holders, as offering a remedy to correct local traction complaints.

The proposed plan is unsatisfactory to the city fathers and since neither the receiver nor the investment bankers could or would offer any other means of giving New Orleans up-to-date service at the franchise fare of 5 cents it has become incumbent upon the city officials to find a remedy.

The city administration appears not to be concerned in the valuation of the property. It seems bent on learning how the lines can be operated so as to live up to the fare fixed in the original franchises held by the several lines making up the present system.

To do this intelligently and satisfactorily four experts will be selected, two of whom probably will be local men, to make a survey of the situation and report back to the Commission Council the result of their findings as to the most feasible, practical and economical plan of operation. When this plan, whatever it may be—whether a modified service-at-cost plan or some other plan—is adopted, then and not till then will the matter of valuation be taken up and considered.

Foreclosure Argument on March 5

Judge Julius M. Mayer, in the United States District Court, at New York, on petition of the bondholders' committee of the New York Railways has set March 5, as the date for argument on the question of issuing a foreclosure decree for the major part of the properties of the system.

Receiver Job E. Hedges was ordered by the court not to pay the semi-annual interest, due on March 1, on the Lexington Avenue & Pavonia Ferry Railway 5 per cent bonds. This will make the third semi-annual instalment of interest on this line in default.

Application for an order to disaffirm the leases of the Broadway & Seventh Avenue line, the Sixth Avenue line, the Twenty-third Street line, and the Christopher & Tenth Street line, all operated by the New York Railways, will be heard on March 9.

Sir Adam Beck Purchase Arbitrator

Sir Adam Beck has been officially appointed to represent the city of Toronto, Ont., in the arbitration to determine the price to be paid by the city for the assets of the Toronto Railway when the railway is taken over next September. The Toronto Railway has not yet named its representative on the board of arbitration, and has informed the city that it does not desire to do so until the third man has been selected. Instead of leaving the selection of the third man to the two other representatives the railway is desirous of reaching an agreement directly with the city in regard to the selection of a chairman, and states that it will name its representative after the chairman has been selected. The city is awaiting Sir Adam Beck's return from England for advice in regard to this request.

Many Factors Contributed to Receivership

Ohio Electric Railway Unable to Contend with Flood, Automobile and Increased Costs

One of the largest systems of interurban roads in the country, the Ohio Electric Railway, has recently been thrown in the hands of B. J. Jones as receiver. It comprises 467.26 miles of interurban lines and 33.36 miles of city lines. The company has outstanding $8,377,200 of bonds and $11,000,000 of stock. No dividends were ever paid on the stock. The road was beset by all the increased costs of the war-time period and just previous to the war suffered severe losses by flood.

THE principal causes that led up to the receivership, which came about through failure to meet the bond interest, are as follows:

1. Inadequate passenger rate of 2 cents a mile that went into effect in 1906.
2. Loss by flood of 1913.
3. Growth of the automobile industry, including transportation by trucks, augmented by the construction of good roads in the State.
4. Excessive costs for new tracks and paving of streets in cities, towns and villages on which the road operated.
5. Abnormal increase in material and wages since August, 1914.
6. Failure of the company to obtain increased rates of fare in cities and for interurban business commensurate with the increased cost of operation.

A small group of financiers conceived and carried out a plan for the Ohio Electric Railway by forming in 1905 the Ohio Syndicate, to which approximately $8,000,000 was subscribed and paid in. They immediately incorporated the Cincinnati Northern Traction Company and leased the Cincinnati, Dayton & Toledo Traction Company, a line extending from Cincinnati to Dayton, with branch lines. The same year they acquired the Lima Electric Railway & Light Company by lease, and in 1909 purchased the property.

APPLEYARD LINES TAKEN OVER

The Appleyard properties were purchased at receivers' sale in 1906. These lines consisted of the Dayton, Springfield & Urbana Electric Railway, the Springfield & Western Traction Company, the Urbana, Bellefontaine & Northern Railway, the Columbus, London & Springfield Railway and the Columbus, Grove City & Southwestern Railway. In 1906 the Dayton & Northern Traction Company and the Dayton & Muncie Traction Company were purchased, also the Columbus & Lake Michigan Railroad, operated by steam. Later they rebuilt this line and electrified it. The same year the Dayton & Western Traction Company was leased likewise the Fort Wayne, Van Wert & Lima Traction Company. In 1906 the Columbus, Newark & Zanesville Electric Railway, including the Columbus, Buckeye & Newark Traction Company, the Newark & Granville Street Railway and the Zanesville Railway Light & Power Company were leased.

In 1907 and 1908 a line was constructed from Bellefontaine to Lima and from Lima to Toledo and the short line cutoff between Summerford and Lafayette (between Springfield and Columbus), thus connecting all lines and completing the system of 617 miles.

All of the lines purchased and leased were practically rebuilt, new cars purchased, new electrical machinery installed, and the system put in first-class operating condition. The Ohio Electric Railway was incorporated May 16, 1907, to take over all the property acquired by The Ohio Syndicate as the operating company.

IMMENSE SYSTEM INCLUDED

The system as completed comprised the following lines:

From Cincinnati to Hamilton and Dayton, with branch line to Germantown.

From Dayton, Ohio, to Richmond, Ind., with branch line to New Paris.

From Dayton, Ohio, to Union City, Ind.

From Dayton to Springfield, with branch line to New Carlisle.

From Springfield to Urbana, Bellefontaine and Lima, with branch line at Bellefontaine.

From Lima, Ohio, to Fort Wayne, Ind.

From Lima to Toledo.

From Lima to Defiance.

From Springfield to London and Columbus, with branch cut off from Summerford to Lafayette.

From Columbus to Orient.

From Columbus to Newark and Zanesville, with branch to Granville and Buckeye Lake.

Also city lines at Hamilton, Dayton, Lima, Newark and Zanesville, all in Ohio.

The line from Cincinnati to Dayton was operated by the company until July 1, 1918, when it was surrendered to the new owners, the Cincinnati & Dayton Traction Company. The line Dayton to Richmond was operated until April 24, 1920, when it was surrendered to its owners.

The Ohio Electric Railway has issued and outstanding the following amounts of stock:

Preferred	$ 3,000,000
Common	8,000,000
Total	$11,000,000

All of the common stock of the leased lines is owned and controlled by the company.

The company has the following bonds issued and outstanding:

First mortgage	$4,200,000
Second mortgage	2,927,200
Lima Electric Ry. & Light Co.	1,250,000
Total	$8,377,200

While no dividend has ever been paid on the stock of the company, it was able to pay all interest on its bonds and rentals to leased lines until the cost of labor and material reached such abnormal proportions on account of conditions caused by the war.

$1,500,000 DAMAGE BY FLOOD

The flood of March 25, 1913, caused damage to the property of the company of approximately $1,500,000.

The business of the company has suffered, like all other traction lines, from the automobile, especially where the roads have been improved.

First Profit in Three Years in Grand Rapids

For the first time in three years the Grand Rapids (Mich.) Railway has been able to show a profit over operating expenses during a thirty-day period. The 8-cent fare now in effect is responsible for the surplus. This profit was revealed for the month of January in the report submitted to the City Commission. It amounts to the munificent sum of $179.53.

In January, 1919, the company operated at a loss of $1,980. In January, 1920, the loss was $5,170.

The earnings from all sources last month was $166,278. The general expenditures were $14,789. The maintenance expense was $21,741, and the cost of power $14,041.44. The total of expenditures including salaries was $115,264,013. From this is deducted taxes, interest on funded debt, amortization of bond discount, sinking fund and depreciation, totaling $50,834.

One of the features of the report is the showing made by the 8-cent fare over the 6-cent fare in vogue in January, 1920, when business conditions were excellent. The 8-cent revenue brought into the coffers of the company $161,117, while the 6-cent fare brought in only $106,737.

12.5 per Cent Increase in Standard's Net Earnings

Preliminary reports of earnings of the utility subsidiaries of the Standard Gas & Electric Company, Chicago, Ill., for the calendar year 1920 show an increase of 18.7 per cent in gross and 12.5 per cent in net. The annual reports of these companies are under audit and the final figures may be slightly changed, but any differences will not be material. The comparative figures are as follows:

Year:	Dec. 31, 1920	Dec. 31, 1919
Gross earnings	$32,252,232	$27,158,137
Net earnings	11,230,742	9,980,446

The 1920 gross and net earnings reports of the individual properties are as follows:

	Gross Earnings	Net Earnings
Arkansas Valley Ry. Lt. & Pr. Co.	$1,865,743	$608,632
Fort Smith Light & Traction Co.	1,070,391	300,793
Louisville Gas & Electric Co.	4,469,317	2,088,990
Mobile Electric Co.	737,446	214,081
Mountain States Power Co.	928,923	294,292
Northern States Power Co.	11,798,779	4,466,938
Oklahoma Gas & Electric Co.	5,070,656	1,276,114
Ottumwa Railway & Light Co. (11 mos.)	513,467	105,185
San Diego Cons. Gas & Electric Co.	2,661,046	883,427
Tacoma Gas & Fuel Co.	561,098	104,909
Western States Gas & Electric Co.	2,224,909	815,268
Puget Sound Gas Co.	163,985	25,916
Southwestern General Gas Co.	292,637	120,870
	$32,252,232	$11,230,742

In spite of continued high costs every property was able to show a consistent gain in net earnings, as well as in the gross.

Financial News Notes

Sale of Real Estate Postponed.—Sale of the real estate of the New York (N. Y.) Railways under foreclosure proceedings, to satisfy the provisions of the indenture securing the first real estate and refunding mortgage 5s has been postponed by consent until March 2.

Hydro Takes Over Guelph Radial Railway.—The ratepayers having voted favorably on the proposal in January, the Guelph (Ont.) Radial Railway was on Feb. 12, turned over to the Hydro Power Commission of Ontario, which will operate and manage the system for a period of fifty years.

Details of Reorganization Fast Being Concluded.—Stockholders of the Market Street Railway, San Francisco, Cal., have ratified the proposal whereby the company will be merged with United Railroads, San Francisco. Under the plan of reorganization of United Railroads, the company will take the name of the Market Street Railway, which will issue new securities. Steps toward foreclosing the mortgage of the underlying bonds have already been taken.

Municipal Line Lost $281 in Six Months.—Operation of the Amarillo (Texas) Street Railway by the municipality during the last six months has resulted in a loss, according to the report of City Manager J. G. Colby covering that period. The city manager's report showed that the city had paid $600 a month for the lease on the property, and that revenues during the time had amounted to $5,789, leaving $2,189 after payment of lease charges. Operating expenses exclusive of lease charges amounted to $2,470, leaving a net deficit of $281 for the six months.

St. Paul Continues to Lose.—Despite the fact that the passenger revenues of the St. Paul (Minn.) City Railway increased from $436,756 in November, 1920, to $459,100 in December, 1920, the company's income shows a deficit for the month of December of $28,254 compared with $6,750 for the preceding month. The very large increase in operating expenses, which more than offset the advance in revenue, is given as the reason. Commissioner McDonald in commenting on the report explains that the cost of removing snow was the principal item in the higher expense account.

Federal Light Makes $601,028 in 1920.—In its twelve months' statement ended Dec. 31, 1920, the Federal Light & Traction Company, New York, N. Y., shows gross earnings at $4,606,421, an increase of 18.2 per cent over the same period a year ago. Expenses, including taxes, increased over 20 per cent and the net income advanced 14 per cent over 1919. After deducting interest charges, Central Arkansas Railway & Light Corporation dividend and Springfield Railway & Light Company dividend a balance of $601,028 remains. This is an increase of 42 per cent over the balance of a year ago.

Deficit of $16,711 for Interurban.—The stockholders of the Indianapolis & Cincinnati Traction Company at the annual meeting on Feb. 9 re-elected officers and directors. The company showed a deficit for the year of $16,711, after deducting all expenses, including the fixed charges, interest on the company's bonds, interest on underlying bonds of the Indianapolis, Shelbyville & Southeastern Traction Company and dividends on underlying preferred stock of Indianapolis & Southeastern Traction Company (Shelbyville division).

Priority of Claims Considered.—The much discussed Grafton Traction Company bankruptcy case, pending in the United States District Court of West Virginia and placed before Referee O. E. Wyckoff for disposition, was considered on Feb. 5 at Grafton, W. Va. Mr. Wyckoff has been working for weeks on this case to determine the relative value and priority of the liens against the company and affiliated corporations and recently he notified the interested attorneys that he would be ready on Feb. 5 to have his findings considered by the several counsel and hear objections and contests of his findings.

Hydro Commission Reports Profit for Interurban.—The first annual report on the operation of the Sandwich, Windsor & Amherstburg Railway, Windsor, Ont., issued by the Ontario Hydro Power Commission, claims a net profit on the year's business of $22,335. The total earnings were $296,373. The sum of $49,000 was set aside for interest on bonds and $82,000 for sinking fund. Assets are placed at $2,144,755, and liabilities at $1,849,000. Extensions and improvements planned for this year will cost more than $1,000,000. The line was formerly owned by the Detroit United Railway.

Tacoma Municipal Line Still Losing.—The Tacoma (Wash.) Municipal Railway from its inauguration to Jan. 1, 1921, has a deficit of $152,556, of which $44,127 was recorded during the twelve months included in the 1920 report of the city controller. The 1920 deficit was about half the deficit of 1919, when the shortage totaled $85,836. The deficit of November, $4,238, increased to $10,373 in December, 1920, but this increase was largely accounted for by the charge of $4,743, representing accrued interest upon the $125,000 in loans made to the municipal railway fund out of the general fund of the city. In 1917, before the extension of the city line to the Todd Drydock & Construction Corporation's plant, the line made a little money, but, with the extension of the trackage, the line began losing and, in 1917 and 1918, showed a total deficit of approximately $22,000. Approximately 3,000,000 passengers were carried on the line during 1920, virtually the same number carried in 1919, the report shows.

Traffic and Transportation

Service-at-Cost Explained

Cincinnati Traction President Seeks to Remove Any Doubts About Recent Grant There

Service-at-cost as operated in Cincinnati, Ohio, is to be explained to the riding public of that city in a statement to be issued by W. Kesley Schoepf, president of the company. Mr. Schoepf hopes to clear up any misunderstanding about the grant that may exist in the mind of the car rider and to show that the Cincinnati Traction Company is a business doing its best to serve the public and seeking in return only enough revenue to pay the interest on the investment. He will outline for the benefit of the public the possible method of procedure that would be taken by a city like Cincinnati to obtain electric railway service if such service were not in operation at present.

By keeping the three elements, the public, the investor and the employee, constantly in mind, says Mr. Schoepf, the question becomes simple and understandable. Attempts to make it complicated or mysterious are generally the work of designing critics who seek by unfair methods to engender the belief of something being wrong that they would attempt to remedy, thus seeking to gain political advantage from a public service that should not be dragged into politics. Mr. Schoepf says that the Cincinnati service-at-cost plan provides for the public the desirable features of municipal ownership with the undesirable ones left out. He holds that it is not alone as a matter of fairness and justice that a return is allowed on money invested, but it is necessary to the raising of new capital for needed improvements that interest be paid on that already invested.

PUBLIC MUST PAY ITS SHARE

Mr. Schoepf maintains that the public, too, has a very definite responsibility in the service-at-cost plan. He says that in the one important item of taxes the public must decide whether or not it wants to make the railway a tax gatherer by imposing upon it a franchise tax, viaduct taxes, street repair taxes, etc., knowing full and well that the public in turn will have to pay it in the form of increased fare. Almost a cent of the car fare in Cincinnati is added onto what would otherwise be necessary simply for the purpose of raising the taxes that have to be paid, the amount of taxes paid in 1919 being $916,472. In 1920 it was slightly more than $1,000,000.

Explaining how in September, 1920, when the rate of fare was 8 cents, the cost per revenue passenger was 8.7 cents, Mr. Schoepf submitted the following itemized account, showing how the revenue per passenger was distributed:

	Cents
Motormen and conductors	2.5
All other wages and salaries	1.33
Cost of power, including coal	1.1
Material and supplies (except coal)	0.9
Taxes (not including city franchise tax)	0.5
Rentals, interest and sinking funds	1.33
Return on capital	0.4
City tax	0.3
Total	8.7

Summing up the whole situation, Mr. Schoepf says that the service-at-cost plan simply means that the city, representing the public, has said to the company, representing the investor:

> We agree with you, that this railway which you have built is worth about $30,000,000, on which we will allow you to earn a little less than 6 per cent, and no more. The interest rate may be low, but we will make it as certain and sure to you as we can, so that you can borrow more money and make the improvements we tell you to make, allowing us to say what kind of securities you may sell and at what price, and what interest you may pay. We will also reserve to ourselves the right to order any kind of service we want and you must give it; because we are willing to pay for it. Finally, if you are very careful and economical and get fares down to 6 cents, we will allow you a little bit more—just to reward your efforts.

Lower Fares Sought in Revere, Mass.

Great public interest in a movement designed to secure better service and lower fares in the Revere section, north of Boston, Mass., was indicated when more than one thousand citizens attended a hearing on Feb. 16 at the State House in Boston. The public hearing was held by the joint committee on street railways, on bills calling for the state to create transportation districts, including the Chelsea and Revere lines of the Eastern Massachusetts Street Railway, and consolidate or lease these lines to the Boston Elevated Railway.

It is understood that the principal grievance of the public is a 15-cent fare from Revere to Boston on the Eastern Massachusetts Street Railway, while other suburbs of Boston, more remote than Revere, are served by the elevated for a 10-cent fare.

The question of discontinued lines was also brought up and criticised, but representatives of the Eastern Massachusetts explained that under the laws creating the Trustee method of operating the system, it becomes obligatory to make lines pay, or else discontinue them.

The Eastern Massachusetts Street Railway has recently published a statement showing that the January, 1921, earnings decreased 16 per cent from earnings of January, 1920.

Fare Increase Allowed

Private Company with Contract Calling for Operation of Railway at Fixed Fare Over-ruled

Judge R. M. Call, in the federal court, has dismissed the petition of the Ortega Company, a realty development concern, for an injunction restraining the Jacksonville Traction Company from charging a 7-cent fare on its lines to Ortega, a Jacksonville suburb, following the award of the Railroad Commission fixing that rate for the company's lines. The Ortega Company contends that the railway for certain cash considerations, franchises, etc., agreed to operate cars on certain schedules with a 5-cent fare. It alleged a breach of contract.

Judge Call held that the decision of the Florida State Supreme Court in the matter of the writ to compel the Railroad Commission to assume jurisdiction was binding in the federal courts. In the case mentioned the court ruled that the commission's duties included the fixing of just and reasonable rates on traction company lines, and that such duties must be performed equitably notwithstanding any private contract.

Under Sec. 30, Art. 16, of the Florida Constitution the State Supreme Court also has held that no public utility can make a binding contract for rates with an individual or corporation, or municipality, except that such contract shall be subject to future legislation. The future legislation in this case was the act creating the Railroad Commission with power to fix just and reasonable rates. This latter ruling was made several years ago when the Tampa Waterworks Company opposed a reduction in rates in Tampa.

The fact that there was a consideration of actual cash in the Ortega Company's contract with the Jacksonville Traction Company has no bearing on the question, according to Judge Call, who pointed to the fact that the franchise consideration, always valuable and with an actual cash value, was always evident in such contracts, and that even financial consideration should not be permitted to buy individual favor over the public welfare. Mention of this suit was made in the ELECTRIC RAILWAY JOURNAL for Feb. 19.

Jitney Menace Intolerable in Paterson

Thomas N. McCarter, president of the Public Service Railway, Newark, N. J., on Feb. 16 notified Mayor Van Noort of Paterson, N. J., that operation of the Public Service Railway lines throughout the Passaic division, which includes the cities of Paterson, Passaic and Clifton, would be terminated unless destructive competition by jitney buses was eliminated by the city authorities of Paterson. Conferences are now in progress as a result of which it is hoped an arrangement may be made that will obviate the necessity of the railway cutting off service.

Seven Cents in Louisville

Temporary Restraining Order by Court Permits Company to Advance Rates in Controversy Many Months Old

Fares on the Louisville (Ky.) Railway went to 7 cents on Feb. 21, with tickets for school children and teachers at 3½ cents, and transfers issued the same as formerly. Judge Walter Evans, of the United States District Court, Louisville, on Feb. 18 issued a temporary injunction or restraining order against the city of Louisville, the Mayor and City Attorney, preventing interference with the increased fare. Judge Evans after reviewing the case during the week ended Feb. 19 announced that the court could not issue a restraining order until the company increased its rate. The company then announced the new rate and the court on the amended petition issued the injunction.

THE COMPANY announced that no rebate slips would be issued for redemption in case the upper courts failed to sustain Judge Evans. Orders were also issued to all trainmen to enforce the order, starting at 4 o'clock on Monday morning, and where people refused to pay the 7-cent fare to eject them from the cars.

Alfred Seligman, attorney for the company, in addressing the men at a meeting on Feb. 18, emphasized patience and courtesy in handling persons who refused to pay the increase, or who might refuse to pay unless given receipts showing the payment. He said in part:

> Avoid any conversation or discussion with passengers of the necessity of action. Some people may not be aware of the raise in fare. Politely call their attention to the printed notices posted in every car. If a passenger refuses to pay the 7-cent fare the passenger should be invited to leave the car, and upon refusal should be ejected, using as little force as possible, but do whatever is necessary to accomplish said fact. When necessary or possible, call the police, but do not ask or direct the making of any arrests.

He stated the law did not differentiate between men and women. In the event that a trainman inadvertently accepted a nickel in payment of fare under the impression that the other 2 cents were to be tendered by the passenger the nickel was to be returned if the extra fare was not proffered at once.

It is expected that the increase in fare will enable the company to pay 5 per cent on preferred stock and 6 per cent on its common.

POLICE WILL GIVE ASSISTANCE

The chief of police issued orders to arrest all persons who refused to pay 7 cents or leave the cars. They will be charged with "breach of peace." Policemen are to act as though 7 cents is the legal rate, it being the legal rate in so far as they are concerned.

Mayor Smith announced that the mandate of the court would be carried out to the letter by himself and the city administration generally. The Mayor's office is refusing to offer any advice to citizens who are anxious to make it hot for the company.

One of the Councilmen who has fought the fare advance has announced that two ordinances will be introduced, one to have the company resume operations of lines stopped under a retrenchment policy and the other to reduce jitney bus licenses to $10, and require a surety bond of $5,000 instead of a real estate bond of $5,000. This will make it much easier on jitney bus operators, but it is doubtful whether they will turn out in any numbers even if the ordinance were passed, and it wouldn't have much chance with the Board of Aldermen, who favored the increase and voted that way. With the Board of Aldermen favoring the company there is not much chance that the Council, which has fought the company, will pass any retaliatory measures.

The city figured on carrying the case to the Circuit Court of Appeals on a supersedeas, which would have prevented the company from putting the increase into effect, but after considering the heavy damages which might accrue to the city if the decision was upheld it was decided not to make that move. Judge Evans did not pass on whether or not the city holds 5-cent contracts.

It will probably take ninety days to arrange the proof and get a decision from the District Court of Appeals.

Officials of the railway figure that the increase will aggregate about $65,000 a month.

The property of the Louisville Railway is assessed for city taxes at $9,000,000, but the company held its property at $28,000,000 in a sworn statement in the Federal court in arguing for a fare increase that would pay dividends. Immediately a movement was started to force back payment on $19,000,000 of valuation not listed for taxation. The company in reply stated that its property was worth the sum stated on the basis of a fare of 7 cents, but not worth it on a 5-cent fare basis.

The 7-cent fare went into effect without any complications from passengers, who paid the increase without arguing, there being no arrests or trouble of any kind. Heavy snow and cold weather on the first day of the new fare failed to slow up traffic. It has been observed that passengers have worked out a system of their own for securing receipts for fares of 7 cents. Riders who do not actually need transfers secure and hold them as receipts for a cash fare paid on a certain date.

Information from the office of James P. Barnes, president of the railway, shows that even in the industrial districts the public has not been the least bit ugly over paying the increase. Talk of walking clubs and other forms of retaliation is not taken seriously, as even the press has pointed out that 7 cents is a very small payment for transportation compared with the cost of time consumed in walking. Jitney buses are not expected to develop as a source of competition under prices for materials and supplies that exist at present.

The city of Louisville has announced that the case will be appealed to the Federal District Court of Appeals, at Cincinnati, in an effort to break the injunction. It will be probably some time between March 15 and April 15, if not later, before the appeal can come up for argument.

Officials of the company claim that there is no noticeable decrease in the number of passengers riding on the cars. There may be some decline in the number of passengers handled in good weather, but any such reduction will be more than offset by the increased fare.

Pay-Leave Plan Suggested for Providence

In order to relieve vehicular congestion in and about Exchange Place, City Hall, and along Dorrance Street, Providence, R. I., Public Service Engineer Ralph Eaton presented to the joint standing committee on railroads of the City Council a plan whereby the fare collection method on the cars of the Rhode Island Company would be changed from a strictly pay-enter plan to the pay-enter pay-leave scheme. Under this plan fares of outbound passengers are collected as they leave the car while on inbound trips fares are collected as passengers board cars in the outlying districts. Mr. Eaton in commenting on the plan states that it has for its object the reduction of delays in the downtown section on outbound prepayment cars.

Briefly, the plan contemplates allowing all passengers to enter cars in the downtown district without prepayment of fare by both front and rear doors, fares being collected as they leave the car. The use of both doors is expected to tend toward a more even distribution of passengers in the car, thus producing more comfortable loading. Moreover, as passengers do not prepay their fare delays are expected to be avoided both to passengers themselves and to following traffic. The disadvantage in this system is that in leaving the car only the rear door can be used as passengers must pay the conductor as they leave.

Mr. Eaton believes that a passenger boarding a car downtown during the evening rush hour is likely to be hampered with bundles, gloves, etc., and is not in as good position to pay his fare promptly as he is after he is aboard the car.

The proposed system if adopted will be installed on trial only on certain lines, probably the Cranston and Broad Street lines, which loop back from the center of the city. The Rhode Island Company has expressed its willingness to co-operate in this trial.

Rehearing in Ottumwa Case

The Supreme Court of Iowa has granted a rehearing of the Ottumwa Railway & Light Company case and has set the case during the March sessions of the court. The case involves the right of cities to fix permanent rates of fare by railways over a period of years.

The court has twice ruled on the matter. Recently it reversed a former opinion and held that cities did not have such a right without legislative action.

In setting the case for rehearing the court has asked for the presentation of printed arguments on the following questions:

> Assuming that the legislative power to make rates still rests exclusively in the Legislature, in that it has never delegated the same ("as appellant claims and as we are inclined to hold") and that, therefore, the City Council has never had the legislative power to fix the rate nor the power to bind the city for a fixed period, what gave validity or irrevocability to the 6-cent resolution adopted by the City Council (of Ottumwa) Dec. 23, 1918?
>
> Even though the city had no power to bind the city to a contract rate for a fixed time, did that fact disable the railway from binding itself to a continuing condition of the franchise as provided in Section 7 thereof, whereby the company could not charge in excess of its specified maximum rate?
>
> Can the company breach or ignore this provision of Section 7 and still maintain its right for franchise?

Transportation News Notes

Wants Ten Cents in Huntsville.—The Alabama Power Company, operating in Huntsville, has notified the Council of that city that it will petition the Public Service Commission for an increase in fares. The present rate is 7 cents and according to W. M. Stanley this is not sufficient to meet operating costs. A 10-cent fare will be sought.

Wants More on Penn Lines.—The Northumberland County Railway, Sunbury, Pa., has filed with the State Public Service Commission a notice of its intention to raise its fare from 6 cents to 7 cents. The Warren Street Railway, Warren, has also notified the commission that it will raise its cash fare from 6 cents to 7 cents. The company proposes to sell tickets at the rate of ten for 63 cents.

Skip Stop in Vancouver.—The British Columbia Electric Railway, Vancouver, B. C., is inaugurating the skip stop. This system has already been placed in operation on the Kerrisdale line, Vancouver, and public opinion is being canvassed as regards its general adoption. So far 95 per cent of the communications received from the railway's patrons have been favorable to the extension of the plan.

Lull in Fare Fight.—The agitation over increased railway fares in Jackson, Miss., has subsided, and though the matter is at rest at present it is highly probable that the Jackson Public Service Company will seek relief from the city without having recourse to the courts. With the hope of increasing its revenue the company recently petitioned the city for permission to advance fares. Subsequently the city put the matter before the people. At a referendum they decided against the advance. Since the election no definite steps have been taken by the Service company.

Jitney Regulatory Bill in Iowa.—A bill which would bar jitney buses from streets on which electric railways are operated has been introduced in the Iowa House by F. C. Lake, Sioux City. Jitneys would, however, be permitted by the bill to cross bridges where there are electric railway tracks and to cross at right angles streets where there are such tracks. Violators of the law would be subjected to a fine of $300 or imprisonment in jail not to exceed sixty days.

Ten Cents Authorized in McAlester.—The Oklahoma Corporation Commission has granted permission to the Choctaw Power & Light Company, McAlester, Okla., to charge a 10-cent fare in that city. Rates along interurban lines will be increased proportionately; between McAlester and Hartshorne from 50 to 55 cents; from McAlester to Haileyville from 45 to 50 cents. In the city special books will be issued with three tickets for 25 cents. On the interurban twelve tickets will be sold for $1 and any one of these will be accepted between points where the cash fare is 10 cents. The new rates became effective on Feb. 15.

Ten Cents Sought in Montgomery.—The Montgomery Light & Traction Company, Montgomery, Ala., has filed a petition with the State Public Service Commission asking permission to charge a 10-cent fare on its lines in Montgomery and suburbs. The company wants a 10-cent fare continued in effect until the income of the property can produce in addition to legal interest on a fair value of the property a stabilizing fund of $200,000. The petition makes clear the company's intention of decreasing the rate of fare to 9 cents and perhaps 8 cents "as conditions and occasion demand." A meeting will probably be held early in March to discuss the petition.

Publication Renewed.—The Twin City Rapid Transit Company has resumed publication of *Rapid Transit News* under date of Feb. 10. This pamphlet will be issued indefinitely "as a medium of direct communication between the company and the car-riding public." In this first number of Vol. 2 an explanation of the Brooks-Coleman bill now before the Legislature is given in detail, prefaced by the needs and activities of the Twin City lines. *Rapid Transit News* says that more miles of extensions were laid in the Twin Cities of Minneapolis and St. Paul during the year recently ended than in any other city in the country with the possible exception of New York.

Syracuse Case Continued.—According to figures submitted by Milo Roy Maltbie, representing the city of Syracuse before the Public Service Commission of the Second District in the proceeding before that body regarding fares on the lines of the New York State Railways in that city, the actual reproduction cost new less depreciation of the lines is $4,864,121. Further testimony is to be taken. The company applied to the commission to charge at least 10 cents after a service-at-cost plan had been rejected by the city. The fare in Syracuse has been 6 cents.

Robbery Plot Fails. — Indictments charging forgery have been returned against the three counterfeiters of car tickets in a plot to rob the Georgia Railway & Power Company, Atlanta, Ga. C. L. Lumkin, a conductor on the Buckhead line, was arrested several days ago and confessed the entire story to railway officials. His confession implicated L. and H. C. Bumpous, who were arrested in Gadsden charged with being the "brains" of the scheme. The men made a contract with a printing establishment in Birmingham and the concern thanked the company in turn for the order. In this way the plot came to light at once, although it would have come to light eventually under the company's plan of checking tickets.

Eight-Cent Fare in Concord.—The State Public Service Commission has authorized the Concord (N. H.) Electric Railways to charge 8 cents in Concord with the privilege extended to patrons of buying ten tickets for 70 cents. Several months ago the railway management petitioned the commission for an increase in cash fares from 6 to 10 cents with an 8-cent ticket fare and a straight 10-cent fare on the Concord-Manchester lines. The commission in its finding states that an increase in fares that will add "approximately $30,000 to what would be secured by the present fare" will help the present problem. The commission expresses the belief that a saving will be effected in the use of the one-man type of car and also in the downward trend of prices.

City Joins in Fare Petitions.—A petition from the city of Sault Ste. Marie, Mich., signed by the Mayor and city clerk and identified by officials of the Sault Ste. Marie Traction company together with a certified copy of a resolution joining the city and the company in an appeal for increased fares, has been filed with the Public Utilities Commission at Lansing. The resolution adopted by the city in the interest of the traction company was passed following a request for such action from that company several weeks ago. The knowledge that the company could not run unimpaired and satisfactorily unless higher fares were granted was found in an investigation by the City Commission, and the city joined with the company in its appeal to Lansing for higher fares. The passage of the resolution by the city was by unanimous vote.

Personal Mention

Promotions in Pittsburgh

M. T. Montgomery Appointed Suggestion Man of Pittsburgh Railways—C. A. Harris Made Storekeeper

M. T. Montgomery, who has been general storekeeper of the Pittsburgh (Pa.) Railways for a little over a year, has been attached to the main office of the company as a "suggestion man." His former position of storekeeper is now filled by Charles A. Harris, formerly assistant storekeeper.

In his new capacity Mr. Montgomery's work is principally outside of the office and consists of meeting employees of all grades and in all kinds of work to get their suggestions for increased efficiency in service and for correction of service and mechanical faults. Through Mr. Montgomery, the general manager, C. S. Jones, is thus able to keep in closer touch with the ideas of the various men on the system, as Mr. Montgomery acts in a capacity of what might be termed the personal representative of the general manager among the employees.

C. A. HARRIS

BOTH ARE EXPERIENCED MEN

Mr. Montgomery's railway experience began in 1898 with the Union Traction Company, which is now a part of the Pittsburgh Railways. After occupying there the position of conductor and later of dispatcher, he was made manager of the traffic department. In July, 1919, after having been manager of railways of the Monterey Railway, Light & Power Company, Monterey, Mexico, for six years, Mr. Montgomery became special assistant to the general manager of the Pittsburgh Railways. A biography and a portrait of Mr. Montgomery were published in the ELECTRIC RAILWAY JOURNAL for Jan. 31, 1920.

Mr. Harris, who succeeds Mr. Montgomery as general storekeeper, is about thirty-six years old. He entered railway work with the Connecticut Company in 1908 as stock clerk for the Hartford Division in Hartford. He was later advanced to the position of storekeeper in Hartford and was then made general stock clerk for the entire system with headquarters at New Haven. In 1917 he accepted a position as assistant chief clerk in the stores department with the Pittsburgh Railways. He was later made storekeeper of the Homewood store, from which position he was advanced to assistant general storekeeper in the fall of 1919.

Mr. McClure Appointed Receiver of Interurban

J. H. McClure has been made receiver of the Indiana, Columbus & Eastern Traction Company, Cincinnati, Ohio, by Judge Killits, Toledo, Ohio. In order to fill this position Mr. McClure resigned as vice-president of the Ohio Electric Railway and as president of the Indiana, Columbus & Eastern Traction Company, the Fort Wayne, Van Wert & Lima Traction Company, the Columbus, Newark & Zanesville Traction Company, and the Columbus Interurban Terminal Company. He has been succeeded as vice-president of the Ohio Electric Railway by H. G. Gilpin, formerly general mangaer of that property.

Mr. McClure was chosen last year by Day & Zimmerman, utility managers, to operate the Ohio Electric Railway, of which they have taken charge. He was previously general manager of the Citizens' Traction Company, Oil City, Pa., where he proved his ability both as an efficient and an able operator.

Major Gustafson Leaves Baltimore

Major Robert K. Gustafson, who had been chief draftsman at Carroll Park Shops of the United Railways & Electric Company, Baltimore, Md., since November, 1915, has left the company to take charge of the engineering and development work of a large manufacturing concern in Little Falls, N. Y. Before entering the service of the United Railways & Electric Company he was connected with the Guggenheim Company of Bisbee, Ariz. In 1917 Mr. Gustafson attended the first Officers' Training Camp at Fort Myer, and at its close was commissioned a lieutenant. He was sent to Camp Meade and in 1918 was commissioned captain, just before sailing for France. He went over with the 79th Division, 304th Ammunition Train, and was transferred to the 5th Division and returned with the 6th Division. He was discharged from the Army in July, 1919. In September, 1919, he was commissioned a major in the Reserves. Major Gustafson was born in New Haven, Conn., in 1891. He was graduated from Yale in the class of 1912.

D. K. Lewis at Winnipeg

D. K. Lewis Takes Position of Electrical Engineer of Winnipeg Electric Railway

D. K. Lewis has been appointed electrical engineer of the Winnipeg (Man.) Electric Railway, succeeding L. Trott. Since December, 1918, Mr. Lewis has been electrical engineer of the Fort Dodge, Des Moines & Southern Railroad, Boone, Iowa.

Mr. Lewis was graduated from Clemson College, South Carolina, in 1903, having specialized in electrical and mechanical engineering. He entered the testing department of the General Electric Company at Schenectady, N. Y., and was later transferred to the engineering office in Chicago, where for twelve years he was construction foreman, installing apparatus in various towns and cities in the Western States. He enlisted in the United States Army in April, 1917, and was discharged in December, 1918.

D. K. LEWIS

The Winnipeg Electric Railway, besides operating 112 miles of track in and about Winnipeg, operates also the Winnipeg, Selkirk & Lake Winnipeg Railway and the Suburban Rapid Transit Company.

Changes in Tuscaloosa Personnel

Charles Hays has been made manager, purchasing agent, claim agent and electrical engineer of the Tuscaloosa Railway & Utilities Company, Tuscaloosa, Ala. Also E. C. Beatty, formerly superintendent of light and power, has been appointed engineer of overhead construction of the company. C. J. Erickson is no longer connected with the company as superintendent of the railway department and as master mechanic, his position now being filled by T. A. McDaniel.

Charles G. Staples has been appointed treasurer of the Springfield (Vt.) Electric Railway.

R. B. Stack has succeeded the late R. L. Utley as secretary of the Escanaba (Mich.) Traction Company.

E. S. Davis has been elected vice-president of the Springfield (Vt.) Electric Railway.

George O. Muhlfeld, managing director of Stone & Webster, has been elected a director of White Oil Corporation, to fill a vacancy.

Allan G. Hoyt, New York, N. Y., has resigned as vice-president of the Washington Railway & Electric Company, Washington, D. C. No successor to him has been elected.

E. Curtis has been appointed engineer of the power station of the Fort Smith Light & Traction Company, Fort Smith, Ark. Mr. Curtis succeeds L. J. Noble, who has been made general manager.

C. V. Means, traffic manager of the Los Angeles (Cal.) Railway Corporation, was elected chairman of the board of governors of the Southern California Passenger Association at the meeting of the board held on Feb. 10, 1921.

A. F. Albee has been appointed supervisor of tracks of the Boston & Worcester Street Railway, Framingham, Mass. Mr. Albee formerly had charge of the repair work and construction for the Marlboro Division of the railway.

John Whitsell, general superintendent of the Chicago & Interurban Traction Company, Chicago, has been appointed operating manager of the Winnipeg (Man.) Electric Railway. He succeeds Frank L. Butler, who resigned to accept the position as manager of the railway department of the Georgia Railway & Power Company, Atlanta, Ga. Mr. Whitsell will assume his new duties on March 15, 1921.

C. M. Young has resigned as superintendent of power of the Columbus (Ga.) Railroad and the Columbus Power Company. Mr. Young has held this position for about fourteen years. He began his career in public utility work about twenty-five years ago.

H. W. Williams has been appointed special representative to the general superintendent of motive power of the Chicago, Milwaukee & St. Paul Railroad, with headquarters at Chicago, Ill. He was formerly assistant engineer in the electrical department with headquarters at Seattle, Wash.

Edward F. Peck, vice-president and general manager of the Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va., was recently run down by an automobile, sustaining internal injuries. Mr. Peck plays a prominent rôle in the city of Hampton, where he has many civic and industrial interests.

F. M. Kirby has been elected president of the Wilkes-Barre (Pa.) Railway. He succeeds the late Abram Nesbitt, who died several months ago. Mr. Kirby is president of the Miners' Bank of Wilkes-Barre and vice-president of the F. W. Woolworth Company. He was born in Watertown, N. Y. He has been a resident of Wilkes-Barre for the past twenty-five years.

A. W. McGuire has been named acting purchasing agent of the Twin City Rapid Transit Company, Minneapolis, Minn., by President Horace Lowry to fill the vacancy created several weeks ago by the promotion of W. Whiteford to acting general manager. Other promotions announced at the same time were those of A. P. Anderson to the position of general storekeeper and George Adams to the office of chief clerk.

Obituary

E. C. Carpenter, Claim Agent

E. C. Carpenter, claim agent of the Northern Ohio Traction & Light Company, Akron, Ohio, was killed on Feb. 12 by an Akron-Canton interurban car at Springfield Lake. Mr. Carpenter had been for twenty years claim agent of the Indiana Union Traction Company, Anderson, Ind., with which he became connected when it was the Anderson City Railway. He served under Charles L. Henry, now president and general manager of the Indianapolis & Cincinnati Traction Company, during the construction of the first interurban electric railway in Indiana, between Anderson and Summitville. During his connection with this company his work and ability were recognized by his election in 1909 as president of the American Electric Railway Claims Association.

In 1911 Mr. Carpenter became general manager of the Pittsburgh & Butler Street Railway and the Butler Passenger Railway, Pittsburgh, Pa. Under his active managership the roadway and rolling stock were greatly improved and during the summer of 1913 the system was changed from 6,600 volts alternating-current to 1,200 volts direct-current. He severed his connection with these companies in 1914. He was appointed claim agent of the Northern Ohio Traction & Light Company in 1918 to succeed H. L. Ehler.

Robert D. Carter, Jr., chief investigator in the claims department of the United Railways & Electric Company, Baltimore, Md., died on Dec. 26 last. Mr. Carter had been in the employ of the railway since September, 1914.

Myles Tierney, banker and one-time traction promoter of northern New Jersey, is dead. Mr. Tierney secured a trolley franchise from the city of Hoboken and built the White line between Hoboken and Paterson. This road was later absorbed by the Public Service Railway.

John F. Chambers, superintendent of steam plants of the Georgia Railway & Power Company, Atlanta, Ga., died on Dec. 12. Mr. Chambers was fifty-one years old. He had been in traction work since 1893, when he entered the employ of the old Atlanta Traction Company.

Skip Stops Given Up

Near-Side Stops to Be Tried in Downtown Districts of Kansas City—Loading Platforms Abolished

The "near-side stop" at all electric railway intersections is to supersede immediately the skip stops in the congested districts of Kansas City, Mo., from Eighth to Twelfth Street and Main Street to Grand Avenue. All loading platforms except at the depot are to be abolished. This is the result of an agreement reached at a committee hearing on an ordinance designed to abolish the present system of car stops.

The ruling of the committee, as outlined above, to which the railway company officials agreed, is to be effective only until the entire rerouted railway system is put in operation and tried out. This is hoped to be accomplished in thirty days. If, in that time, it is found that the near side stop system in the downtown district has proved satisfactory, the committee expressed its intention of recommending the passage of the ordinance, but for the present the ordinance is held in abeyance.

F. W. Fleming, one of the receivers for the railway, called attention to the fact that the ordinance as drafted would reduce the car speeds maintained at present, causing inconvenience to patrons. The passage of the ordinance would not only react on the car rider but would cause an additional expense of $750 a day to the company. The receivers, however, take the view that in justice to themselves they should place before the public the consequences of disturbing the system. Their only ambition is to give the best possible service and put the company on its feet.

Mr. Culkins Studying Cincinnati Figures

Figures requested by William C. Culkins, director of street railways, from the Cincinnati (Ohio) Traction Company to show cause for an increase in fare to 9 cents on March 1 have been received by Mr. Culkins from Walter Draper, vice-president of the company.

According to the statement gross receipts for 1920 were $8,959,996. The cost of operation was $9,625,301. Receipts for December when an 8½-cent fare went into effect were $821,585. The cost of operation in December was $915,733. In January receipts were $781,380. The cost of operation in January was $812,573.

The total deficit for December and January was $125,340. The company says the increase in fares is based upon the deficits during December and January under the terms of the service-at-cost franchise.

Mr. Culkins after receiving Mr. Draper's figures said that he would consult with Saul Zielonka, city solicitor, and would then announce what course the city will pursue.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER.
SALESMAN AND PURCHASING AGENT
ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Coal Production at Low Level

With Stocks and Demand Light, Bituminous Loadings Are Lowest in Ten Months

Bituminous coal production during the week ended Feb. 12, from the latest Geological Survey reports, showed a decline to 7,861,000 tons for that week, the lowest production since last April, although it is about the same as that of the corresponding week of 1919, but much lower, however, than for 1918 and 1920. The present condition of the coal market resembles quite closely the period which followed November, 1918, when industrial depression and a mild winter combined to limit demand. Early in 1919, however, the consumers had good stocks on hand; the stocks now are known to be very much lower.

The 1921 production is fast going down hill and the industry is said to be now approaching a condition resembling the quiet period of 1919. That the depression has not yet reached its lowest point is shown by the steady decrease in production indicated by advance reports of loadings by the railroads, according to the Geological Survey.

Prices also are reported to be very low and demand is weak. Mild winter weather, quiet industrial and railroad conditions and the lack of export demand keep the requirements at a low level.

Fair Demand for Trolley Wheels

Deliveries Are Good, Though Stocks Are Not Large—Producers See Good Year Ahead

Along with the slump in buying of virtually all material on the part of electric traction companies there has come a lessened demand for trolley wheels. Several of the large manufacturers report that despite this drop in sales a very fair volume of business is being placed right along. Worn out wheels, of course, have to be replaced, and it is undoubtedly this "necessity" buying that accounts for the fact that one or two factories are still working on orders previously booked. There is this distinct difference to be noted in the present orders, however, that they do not cover the needs of railways very far in advance. This is to be regretted, manufacturers state, because deliveries are now favorable, prices at a fair level and metal quotations unprecedentedly low. Almost without exception producers see a bright year ahead for sales.

Deliveries are reasonably prompt, in some cases orders being filled from stock, especially on wheels which have come to be recognized as more or less standard. In general stocks of the finished product are not large, one representative producer, for instance, having not a trolley wheel in stock and another virtually none. This condition of course does not obtain all over the field.

Prices in this line have declined but slightly. The shading has resulted from lower copper costs chiefly, as several manufacturers state that their labor costs are no lower yet. It is estimated by a large manufacturer of trolley wheels that the drop in prices from their peak has averaged about 5 per cent. This seems a fair proportion when it is remembered that in a table of price comparisons with pre-war prices for about fifty items appearing in the June 19, 1920, issue of the ELECTRIC RAILWAY JOURNAL trolley wheels showed the smallest precentage of price increase but one. The price of a 6-in. wheel in 1920, according to this table, represented but a 22.3 per cent increase over 1914. And it must be remembered that it requires only about an 18 per cent decrease from the peak quotation to wipe out this increase in price.

More Views on the Price Situation

Several Buyers of Electric Railway Equipment Who Were Interviewed Think Prices of Some Material Warrant Further Reduction—Buyers' Market Versus Sellers' Market

In the issues of Feb. 5 and Feb. 12 were presented the views of several large manufacturers of electric railway equipment on the question of current prices, their effect upon buying and the justice of existing quotations. There is another side to the matter of course—that of the railways. In an endeavor to present the feeling of the buying end of the industry in the matter of prices ELECTRIC RAILWAY JOURNAL has asked the views of several representative officials of traction companies, a few of which appear in part below.

One of the prominent purchasing agents in the East asks: "Why will not the manufacturer take some losses just now, when he, like the rest of us, is asking retail merchants to do the same? In a great many cases, especially among the larger manufacturers, they are not willing to do this, notwithstanding their tremendous profits during the war. This statement is based upon a couple of interviews I have had with representatives regarding copper products. One of them told me, 'We can't reduce our prices because we are using 19-cent copper,' and yet this same chap not long ago was lacerating such retailers as clothing and shoe dealers, because they would not take losses."

BELIEVES MANUFACTURERS ARE SINCERE IN PRICE VIEWS

In justice to the manufacturers, however, the general manager of one of the large Middle Western traction companies gives it as his opinion that manufacturers honestly do not feel they are charging exorbitant prices. This he attributes to a reckless wartime expenditure of money by manufacturers which makes it impossible for them to get back to a normal profit at the present time. This railway man does have this to say, however, that present prices of railway equipment are still higher than labor and raw material costs warrant. This he accounts for by the belief that a large percentage of manufacturing concerns are still basing their overhead charges on a war basis, and until such time as they will trim down their overhead he thinks it will be impossible to have lower prices.

EXPECTATIONS OF INCREASED RATES NOT REALIZED

The general manager of another property located in the Middle West outlines the situation in the following words: "The electric railways readily followed the trend of prices upward because they felt sure that relief would be given them in increased rates or revenues, or else by the reduction of their burden to correspond. This faith was not fully justified, as it turned out, and therefore the industry has taken the position that it can and will get along without the things that it wants and in fact needs until the price is where it can afford to buy them. Those who are the more dilatory in bringing their prices down to the basis of their value, or rather to the point at which the buyer will commence to buy, will be the only sufferers, because when they finally do reduce, as reduce they must, they will find that they have incurred, in addition, an extra selling cost which will entail an added loss. When there are more sellers than buyers the wise seller will go out to meet the buyers. Most of our sellers have forgotten this during the past five or six years that a sellers' market has prevailed."

Boston Elevated Loses Forty Cars in $400,000 Fire

Fire which started in the Neponset, Mass., carhouse of the Boston Elevated Railway early last Monday morning destroyed about forty cars and caused a loss estimated at $400,000. The equipment destroyed, in addition to the total loss of the building, stock of material and tools, which were valued at about $200,000, included twenty-three articulated cars, eight semi-convertible motor cars, four trailers and four miscellaneous cars and plows. Five cars in the storage yard were burned but can be repaired. Five other cars in the yards were undamaged and ten cars on one of the tracks in the carhouse were got out before the flames reached them. Cars from other parts of the system were transferred to restore normal service immediately.

Pole and Tie Producers Foresee Buyers' Market

Annual Convention of Northern White Cedar Association Takes Optimistic Tone, However

The twenty-fifth annual meeting of the Northern White Cedar Association, held in Minneapolis, Minn., on Feb. 8 and 9, was attended by thirty-two firms representing producers of poles, ties, logs, etc. The president of the association, after reviewing the wartime period of inflation and speculation, stated that the member companies had weathered the period of declining values and slumping demand in the latter part of 1920 much better than many other industries. "During the first half of 1920," the report states, "we were riding the peak of the wave. Most of our members were able to dispose of their products before the recession came."

NEED OF STRENUOUS SALES EFFORTS IN PRESENT YEAR

Regarding the outlook for the present year, however, genuine work and sales effort are seemingly going to be required to maintain sales. "We are starting 1921 with January, as a whole, the poorest business month in years. February should be better, and along later in April and the first of May we should be acquiring a full head of steam and be going ahead on a real normal basis," President Furlong stated. L. A. Page, Jr., of Page & Hill Company, speaking for the pole advertising committee, said: "Let us suggest that there will be no reward in 1921 for the man or concern who quits cold or lays down. . . . The customers of the members of your association will be somewhat more careful as to prices and more critical regarding quality. . . . Business will be good this year—for the man who thinks and digs for it. The intelligence of your sales effort and extent of your advertising will determine the size of your 1921 crop of sales."

Membership of the association increased from forty-four to forty-nine companies in 1920. Seven new companies were admitted to membership while two others withdrew. The officers elected for the new term were: Benjamin Finch of Finch Brothers, Duluth, Minn., president; W. B. Thomas of the White Marble Lime Company, Manistique, Mich., vice-president; H. F. Partridge, Minneapolis, treasurer; M. H. Schussler of the Coolidge-Schussler Company, Minneapolis, and W. C. Meader of the Bell Lumber Company, Minneapolis, directors, each director to serve two years.

Levis County Railway Loses Heavily in Fire

Fire originating in one of the cars in the carhouse of the Levis County Railway, Levis, Que., Canada, last Monday, caused a total loss of $230,000, Canadian value. Canadian exchange is quoted at 87.6 cents at present. Because of extremely low water pressure the carhouse, shops and contents were completely destroyed, with the exception of four Birney safety cars, two other new one-man cars and the construction cars.

The rolling stock destroyed included eight Birney safety cars, valued at $9,600 each (Canadian money); four Brill double-truck cars, valued at $6,000; three single-truck converted one-man cars, with a value of $5,000 each; four single-truck, double-broom sweepers, $6,000 each; one double-truck rotary plow and one single-truck rotary plow. These fifteen cars, four sweepers and two plows represent the entire rolling stock of the company with the exception of the six cars noted above as saved. The carhouse and shops were valued at $40,000 and the supplies and parts therein at $30,000. The loss is fully covered by insurance.

Electrification of Railroads in South Africa

A cablegram from Trade Commissioner Stevenson in South Africa to the Department of Commerce states that tenders are invited until May 3 for equipping the railway from Cape Town to Simonstown and other lines for electrical operation.

Rolling Stock

Delta Light & Traction Company, Greenville, Miss., has placed orders for two new cars, it is learned.

Louisville (Ky.) Railway Company, it is stated, has on its program of improved service purchase of about seventy new cars of the Peter Witt type, after the 7-cent fare which has just been authorized has been in operation for a certain length of time.

The Connecticut Company lost two passenger cars in a head-on collision which occurred on its Bridgeport-Shelton line, Feb. 22. A can of gasoline carried by one of the passengers exploded, burning the two cars to the trucks. Eight passengers were burned to death and twenty injured.

Hartford & Springfield Street Railway Company, Warehouse Point, Conn., suffered a loss estimated at $60,000 recently when the carhouse and its contents at Windsor Locks were destroyed by fire. The equipment burned besides the buildings, included three closed double-truck passenger cars, a large snowplow, one open double-truck car, one work car and a sand car, besides tools and car parts valued at $5,000.

Interstate Public Service Company, Indianapolis, Ind., has received the first of the ten all-steel interurban cars built by the Cincinnati Car Company for operation of through service between Indianapolis and Louisville. A trial trip was made from Greenwood to Louisville on Jan. 24. Harry Reid, president of the company; H. H. Buckman, master mechanic, who was responsible for the design of the car, and other officials made this trip to determine what changes, if any, may be necessary along the line before the cars are all placed in operation. Various tests were made to determine the current consumption and other phases of operation. Parlor cars will be put in service later and operate as trailers on through service between Indianapolis and Louisville. The new cars are 62 ft. long over all and are capable of obtaining a speed of approximately 75 miles an hour.

Track and Roadway

City & Suburban Railway, Brunswick, Ga.—It is likely that in the near future the City & Suburban Railway will extend its car line to Arco, a distance of 2 miles.

Columbus (Ga.) Railroad.—The Columbus Railroad expects to build 6,520 ft. of track, using 70-lb. rail on ballast, three diamond point turnouts, one Manganese railroad crossing.

New Jersey & Pennsylvania Traction Company, Trenton, N. J.—The New Jersey & Pennsylvania Traction Company on Feb. 15 filed with the Board of Public Utility Commissioners its answer to the petition of the City of Trenton which seeks to force the relocation of tracks on West Hanover street, Trenton. The company says that it would cost about $75,000 to do the work and that when it was first installed the work was under the supervision of the city. The company also says that it is without credit which would enable it to borrow the necessary funds and asks that the petition of the city be dismissed.

Galveston (Tex.) Electric Company.—Extension of the railway service by the Galveston Electric Company so as to give service to the extreme western portion of the city is asked in a communication presented to the City Commission by representatives of the Galeston Dock & Marine Council. A committee consisting of Frank S. Anderson, city attorney; J. H. Gernand, commissioner of streets and public property, and J. C. Purcell, commissioner of finance and revenue, was appointed to investigate the feasibility of such an extension and to report back to the commission.

Wheeling (W. Va.) Traction Company.—The Wheeling Traction Company expects to build within the next three months three new sidings and turnouts with Nachod signals.

Power Houses, Shops and Buildings

Arkansas Valley Railway, Light & Power Company, Pueblo, Col.—The Arkansas Valley Railway, Light & Power Company is planning an addition to its power plant in Pueblo. The plant will house a new 10,000 hp. steam turbine, boilers and surface condensing equipment. Other improvements are also under way including a new substation at Fowler, Col. The improvement plan will total about $1,000,000.

Hartford & Springfield Street Railway, Warehouse Point, Conn.—A carhouse of the Hartford & Springfield Street Railway in Windsor Locks was destroyed by fire on Feb. 6. The loss is estimated at $60,000.

Evansville, Ind.—Warren T. McCray, Governor of Indiana, has assured Mayor Benjamin Bosse at Evansville, Ind., that he will do all in his power to secure legislation to build a bridge across the Ohio River at Evansville. It is proposed to use the bridge for traction lines as well as vehicles. The bridge committee at Evansville, of which Henry C. Kleymyer, president of the Chamber of Commerce is a member, hopes to get an appropriation of $1,500,000 from the Indiana state legislature for the building of the proposed bridge. A similar amount will be sought from the Kentucky state legislature.

Empire State Railroad Corporation, Oswego, N. Y.—The Empire State Railroad is considering the matter of a modern station in a centrally located portion of the city. General Manager Odell, in consultation with officials and business men, has stated that the company needs larger accommodations than are afforded by the West First Street substation. The company wants a station where interurban and local lines pass.

Bamberger Electric Railroad, Salt Lake City, Utah.—On Jan. 31 the new depot at Kaysville, Utah, was opened by the Bamberger Electric Railroad for the use of the traveling public.

Beaver Valley Traction Company, New Brighton, Pa.—The Beaver Valley Traction Company expects to purchase one set of Nachod Signals. The company will also remodel its power house in order to provide additional shop facilities for inspecting and repairing.

Trade Notes

The Thomas A. Edison Company, Inc., West Orange, N. J., has filed notice of increase in capital stock from $2,000,000 to $3,000,000.

T. B. Skelton of the sales department of the Metal & Thermit Corporation, New York City, has been transferred to the Chicago office. His new address in that city is 6138 Langley Avenue.

The Washington-Virginia Railway Company, Washington, D. C., has purchased from the Economy Electric Devices Company a complete equipment of watt-hour meters for its six interurban cars. These meters will be of the power-saving type, equipped with car inspection dials.

The Long-Bell Lumber Company, Kansas City, Mo., is planning to erect a large mill and lumber plant on the Cowlitz River at Kelso, Wash. The proposed plant will have a daily capacity of 1,000,000 ft. and will be equipped with electrically driven machinery throughout. The company turns out wood poles of all kinds and other lumber products used in the electrical industry.

George E. Learnard, president of the International Combustion Engineering Corporation, 11 Broadway, New York, has just gone abroad to confer with certain officials of the Underfeed Stoker Company, Ltd., of London, England, as well as with some well-known men of France. Through the International company there is close affiliation between the Underfeed Stoker Company, Ltd., London, and the Combustion Engineering Corporation, New York. The Underfeed Stoker Company, Ltd., is planning to build a large new factory near London, and Mr. Learnard is to be present when this work starts. It is also expected that he will be on hand when work is started on a French factory. Mr. Learnard's belief is that the whole subject of proper combustion engineering is more or less a keystone in any reconstruction and rehabilitation program and that the general moral effect of considering the enormous economies that can be brought about by proper combustion engineering is perhaps more helpful to the general situation than the mere saving of dollars that it represents.

The Electro Service Company, Marietta, Ga., manufacturer of surge arresters, has recently appointed the following sales representatives: The R. W. Lillie Corporation, 176 Federal Street, Boston, and 30 Church Street, New York City, to cover the territory in New England and the upper part of New York State; the W. D. Hendry Company, Hoge Building, Seattle, to represent the company in the States of Washington and Oregon, British Columbia and Alaska; Jones & Hitchin, Lonja del Comercio 216, Havana, Cuba.

John Hunter, power plant engineer, has just accepted the office of chief engineer of the Heine Safety Boiler Company, St. Louis, Mo. Mr. Hunter was born in Scotland, where he was educated and served his engineering apprenticeship, following which he entered the marine engineering service. In August of 1905, Mr. Hunter became chief engineer of power plants of the Union Electric Light & Power Company of St. Louis, and since that date has been associated with various other important power projects. He is a past president of the Engineer's Club of St. Louis, and was a member of the Jury of Awards, Department of Machinery, at the San Francisco Exposition. In the American Society of Mechanical Engineers he was member of the Council as manager for three years, and as vice-president for two years.

New Advertising Literature

Insulation.—John C. Dolph Company, Newark, N. J., has issued a thirty-one-page descriptive catalog of "Dolph" insulating varnishes and compounds.

Conductors.—"Aluminum Electrical Conductors" is being distributed by the Aluminum Company of America, Pittsburgh, Pa.

Instruments.—The Westinghouse Electric & Manufacturing Company has developed the type SX switchboard ammeters and voltmeters.

Pulverized Coal.—Catalog No. 72 on "Pulverized Coal Equipment" has just been issued by the Fuller-Lehigh Company, Fullerton, Pa.

Hydraulic Valve—The Larner-Johnson Valve & Engineering Company, Philadelphia, has issued bulletin No. 2, descriptive of the Johnson hydraulic valve and differential surge tank.

Electric Cranes and Hoists.—The Northern Engineering Works, Detroit, has issued general catalog No. 28, covering its electric traveling cranes, hoisting machinery, etc.

Lightning Arrester.—A vacuum-type lightning arrester for telegraph, telephone and signal circuits has been placed on the market by E. Jacobus, 79 Orange Street, Newark, N. J.

Oil Coolers.—The Griscom-Russell Company, New York City, has issued a booklet entitled "The Cooling of Quenching Oil in the Heat Treatment of Steel."

Locomotives.—Digest bulletin No. 44013A of the General Electric Company is entitled "The Electric Divisions of the Chicago, Milwaukee & St. Paul Railway."

Automatic Generating Stations.—General Electric Company, Schenectady, N. Y., has issued a twenty-three-page illustrated bulletin, No. 40604, entitled "Automatic Hydro-Electric Generating Stations."

Steel Structures.—McClintic-Marshall Company, Pittsburgh, Pa., has published a twelve-page illustrated booklet on various types of steel structures erected by them for railroads, including bridges, shops, terminals, roundhouses, etc.

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"Come over here a minute and tell me which is the best of these two pieces of metal," said Mac as he held up two rusty sections of $\frac{3}{4}$-in. stock about 3 in. long.

"I dunno; they're both covered with rust," said Jim.

"Watch me a minute," said Mac, picking up one piece and putting it on the emery wheel. "Here you get a lot of bright flashy sparks which shows this piece is cast steel, while this (putting the other piece on the emery wheel) gives a few dull red sparks, easily recognized as manganese. And of course, it's better metal than cast steel.

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—and now read this clipping

The Safety Car is well named when it is equipped as the great majority of them are—with H-B LIFE GUARDS. Practically three times as many passengers carried on the Safety Cars as on two man cars, per injury! The H-B operation is entirely automatic—the protection rendered against fatal front end accidents is absolute.

Write for the list of roads
H-B Life Guarded.

THE CONSOLIDATED
CAR FENDER COMPANY
Providence, R. I.
General Sales Agents
WENDELL & MACDUFFIE CO.
61 Broadway, N. Y.

A point of great interest to the public and to the operators alike is the relative safety of operation of two-man and of one-man cars. W. H. Burke has treated this subject so exhaustively in a recent issue of the ELECTRIC RAILWAY JOURNAL that it is unnecessary to go into any great detail. He demonstrated conclusively that the safety car was well named, that it actually does have fewer accidents than the older cars handled by two men and that personal injuries both of the public and employees are reduced by its use. But some figures along a similar line, derived from the reports of a greater number of companies, may be of interest. The questionnaire sent out in the inquiry on which the present article is based called for the relative number of accidents involving personal injuries, both in terms of car-miles operated and of passengers carried. Fourteen companies operating 560 safety cars replied with definite figures. Only one showed any increase in such accidents, one reports no change and twelve report a material reduction. The average of the replies on this subject can be grouped as shown in the above table.

ACCIDENTS INVOLVING PERSONAL INJURY

Total accidents per 1,000 car-miles		Passengers Carried per Injury	
Safety Cars	Two-man Cars	Safety Cars	Two-man Cars
0.39	0.59	123,000	49,000

These figures are even more favorable than Mr. Burke's, his data being based on all accidents, whether involving personal injury or not. In addition to the fourteen roads which gave statistics on this subject, seventeen others expressed opinion, and only two of these claimed any increase in personal injuries. The balance report "personal injuries reduced" "step accidents less," etc..

A Full Day's Work

There are many problems pressing Electric Railway Managers for solution today. A full day's work would answer most of them.

How much does a street car worker produce? As much as he *thinks* he ought to produce. If he produces only 40%, that represents his conception of a full day's work. His production depends on his mental attitude, and that in turn depends on the views and ideas which he absorbs. Street railway production is down, and street railway wages are up. Evidently the subject of mental attitude requires serious attention at the hands of Management.

A full day's work can be secured on your property by educating the worker to a clear conception of proper relationship, resulting in harmony, co-operation, stability, and service to the public. In this constructive education we have been privileged to serve broadly in numerous industries; our results have been tried and tested by hundreds of plants and properties, and our success has built for us the largest business of its kind in the world. We can bring about a full day's work for you, resulting in an improvement which will be thoroughly satisfactory to you and your associates.

It will pay you to look into the cash value of our service as applied to your situation. Let us explain how your results can be improved. Our nearest office will be glad to send a representative on receipt of your inquiry. There is no obligation.

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Toronto
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Largest organization of its kind in the world. Founded April 7, 1910

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Bad Track Maybe?

But we can stop this anyway

Track rehabilitation costs such a whale of money now-a-days that it's put off as long as possible.

But bad track surely does spell trouble for the car equipment. Particularly such things as brakeheads, which can't stand the slam and shock of bad joints very long unless they are made of the toughest stuff known to man—

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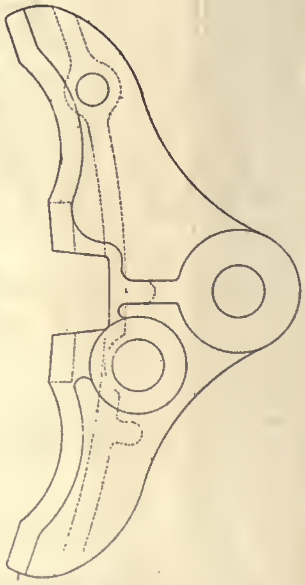
The same quality of quadruple life top-safety material goes into these other truck and brake specialties, too:



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Bolster and Transom Chafing Plates
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"So tough they cannot be drilled, and still pliable enough to bend without breaking."

And, of course, most everybody knows, uses and endorses Boyerized Brake Pins and Bushings.

Bemis Car Truck Company
Electric Railway Supplies
Springfield, Mass.

Maya

The Hindus claim all weak spots in their mythology can be explained by proper interpretation.

For instance, when the god Krishna swiped the milkmaid's clothes and made her come out of the water and beg for them he wasn't advocating swiping as a general pastime.

That is all Maya, or illusion, say the Hindus; what Krishna really meant to teach was a lesson in humility.

Illusions have no place in Central Station practice. If you are having brush trouble there is no excuse for it. There's a Morganite engineer right near you. He's a diagnostician and a prescriber. He'll locate the *cause* of the trouble, then concoct a brush which will suit your conditions of service.

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It's a simple thing to lay down a piece of combination slot insulation (cut to specification) and insert the coil or coils. Irvington slot insulation is made up of a layer of varnished cambric and a layer of fibrous paper solidly cemented together with a flexible insulating compound that will not dry out.

It is made in thicknesses from 12 mils to 30 mils and supplied in sheets, roll form or strips.

Dielectric strength varies from 500 to 750 volts per mil depending upon thickness.

Demand for this new popular product is increasing rapidly as its existence becomes known.

Let us furnish you a sample order to convince you.

Main Office and Factory

Irvington Varnish & Insulator Co.

(Established 1905)

Irvington, New Jersey

The Fallacy of "The Guaranteed Contract"

Though, for a span of years a number of street railways have been buying lubricants on a guaranteed mileage basis, the evolution of lubricating engineering is demonstrating the undesirability of such contracts.

They cramp and confine genuine improvements and they confer no advantage on the buyer.

They limit the real service of a seller truly cognizant of the opportunities which are his to cut costs and promote efficiency.

When lubricants are bought on a guaranteed basis, the great thought in the mind of the oil seller is to reduce lubricating costs to compare with his guaranteed figures.

To bring about these results, the oil seller may have to cut the consumption of lubricants to the utmost limit, and frequently below a safe limit. This very often at the sacrifice of bearings. Hot bearings are not the most expensive things that can occur; it is the slow and constant wearing away of bearings, due to inefficient lubrication, which may occur when the bearings become hot, that will cause maintenance cost to rise, and when we consider the cost of oil in proportion to the maintenance cost, the figures are so vastly different as to show the fallacy of compelling operating men to keep within a certain limitation on the amount of oil which they should use, and to lose sight of the more important factor of maintenance costs.

An analysis of the whole situation shows that time, labor and money are being spent to gain a reduction of a few cents per thousand car miles, amounting, as exact figures will show, to less than a thousandth part of the total cost of operation.

With the same energy and money expended in an effort to reduce the remaining nine hundred and ninety-nine parts would bring so much greater returns.

Realizing that the right to make destructive criticism is contingent on a constructive alternative, we shall go into this further in our next announcement, but in advance will say this briefly: Purchase high quality lubricants on a gallonage basis, from a Company that can offer intelligent and trained engineering service, for instance, Texaco Service.

Last Advertisement—"Delivery Facilities"
Next Advertisement—"Lubrication and Maintenance Costs"

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gives insurance against a continuous big *labor cost* for renewals and replacements in the many railway uses for lumber.

When you specify and use

All Heart Cypress for Ties, Fencing, Trunking and Capping, Cross Arms, &c

you know it will give longer service than any other material. You know, too, how labor costs exceed material costs in almost every case. Of course even Cypress may eventually have to be replaced. Nothing lasts quite "forever." But in the long service-life you get from all-heart Cypress you will have *saved* a lot of labor costs in *maintenance alone.*

Anyway, that's why a number of the biggest railways in the country *insist* on All-Heart Cypress.

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will answer every requirement. Carnegie Steel Company is especially well equipped to supply your needs. Our wheel mills produce all kinds and sizes from small industrial wheels to wheels for the heaviest electric traction service. New high power equipment, skilled workmen, trained engineers and a responsible organization guarantee your satisfaction.

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Carnegie Wheels are an investment, not a speculation—you know what you are getting.

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General Offices: Carnegie Building, Pittsburgh, Pa.

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Made for 4 in. and 6 in. wheels, suitable for city and high speed service.

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Represented by the
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T. S. Q.
says

"I worked for one railway line a while & got fired. They thot cheaper help would do. Then they found out — I'm back on the job, again, for life the boss says.

Bates One-Piece Steel Poles with Ornamental Lighting

This installation illustrates one of the possibilities of combining Artistic Bates Poles with ornamental lighting units.

The excessive number of poles required where trolley conductors and lighting units are installed on separate poles is not only decidedly inartistic, but is also a needless waste of good material. Of course, it is necessary that an artistic steel pole be used for such a combination of purposes.

The series lighting conductor is run from pole top to pole top eliminating the use of expensive, troublesome underground cable.

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Buy Globe Tickets when you need School Tickets, Commuters' Tickets, in fact any form of ticket.

Let us send you samples

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By inducing them to buy tickets at reduced rates. People will often ride a few blocks if they happen to have tickets but will walk rather than pay a full cash fare. They are not only convenient but necessary.

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7 in. Girder Welded to 7 in. Trolley Rail

Reduce Compromise Joint Maintenance by

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Probably no problem connected with street railway work causes more annoyance and expense to the "way department," in proportion to its magnitude, than the proper maintenance of compromise joints.

Mechanical joints have not proved satisfactory, as the plates are seldom accurate and it is exceedingly difficult to obtain either a forged or cast plate which will hold the rails to gauge or surface. Another serious objection is the difficulty of obtaining a satisfactory bond.

The Thermit Insert Process, however, will overcome the objections to every other type of joint, with the added advantage that the welds can be made by the street railways themselves either in their shops or in the street and can therefore be had at a minute's notice and without the necessity of carrying a stock of special plates or special cast joints designed for this purpose.

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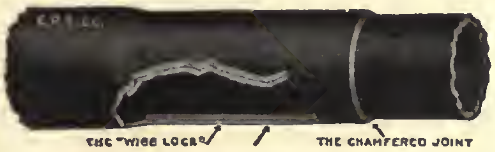

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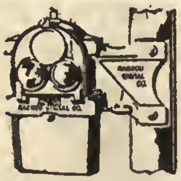

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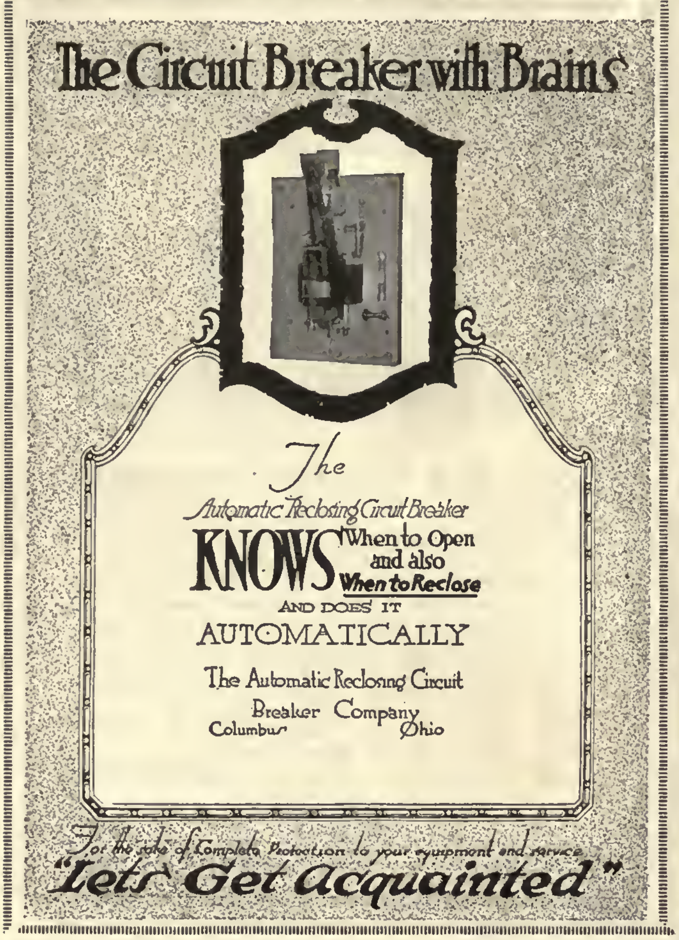

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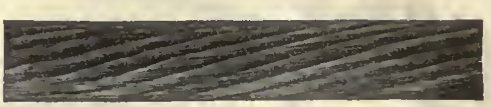

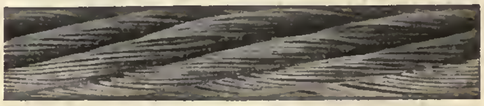

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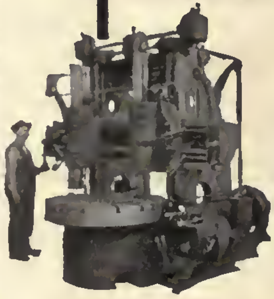

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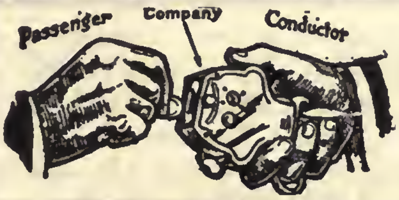

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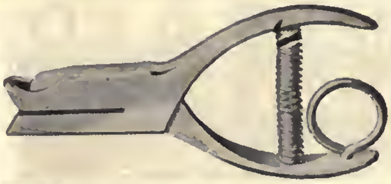

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Cleveland Fare Boxes protect all the fares. They accommodate any rate of cash fare and any kind of ticket.

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"Union" Renewable Fuses will save four-fifths of your fuse maintenance cost. Guaranteed to give satisfaction. Money back if they fail. Booklet on request.

CHICAGO FUSE MFG. CO.
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Type R-10

International Registers

Made in various types and sizes to meet the requirements of service on street and city system.

Complete line of registers, counters and car fittings.

Exclusive selling agents for HEEREN ENAMEL BADGES.

The International Register Co.
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WE CAN CUT YOUR COST OF HEATING CURRENT
Write for THERMOSTATIC CONTROL INFORMATION

GOLD

ELECTRIC HEATERS Cut Installation and Maintenance Charge.
VENTILATORS Also Ventilate in Stormy Weather.
THERMOSTATS Save Current.
ORIGINATED the use of NON-CORROSIVE Wire for Electric Car Heaters.
ORIGINATED The Ventilated Coil Support.

LET US FIGURE ON YOUR NEXT REQUIREMENTS
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THE CUTTER ELECTRICAL AND MANUFACTURING CO. CIRCUIT I-T-E BREAKERS PHILADELPHIA

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Circuit Breakers

for heavy street railway work are the best obtainable. Write for New Complete Catalogue.

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Let us demonstrate to you how we can heat and ventilate your cars at the lowest possible cost

The Cooper Heater Company
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BAKELITE-DILECTO
The fields of usefulness for Bakelite-Dilecto are many and varied because of its superior merit over materials heretofore available in sheets, tubes or rods. The exceptional qualities of Bakelite-Dilecto are satisfying electric railways all over the country. Investigate.

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Pittsburgh Office, 381 Fifth Ave. San Francisco Office, 525 Market St.
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Canadian Office, 1710 Royal Bank Bldg.,
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THE TERRY TURBINE
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TERRY STEAM TURBINE CO.
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They are uniform in quality

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The Plywood made with waterproof glue

An Engineering Material
used by car builders

for

Roofs
Headlining
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Ceilings
Bottoms and Backs of Seats

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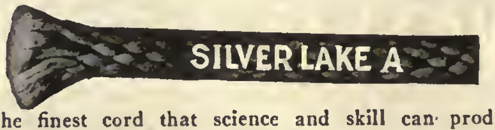

Is the finest cord that science and skill can produce. Its wearing qualities are unsurpassed.

FOR POSITIVE SATISFACTION ORDER SILVER LAKE

If you are not familiar with the quality you will be surprised at its **ENDURANCE and ECONOMY**

Sold by Net Weights and Full Lengths

SILVER LAKE COMPANY
Manufacturers of bell, signal and other cords.
Newtonville, Massachusetts

A Single Segment or a Complete Commutator

is turned out with equal care in our shops. The orders we fill differ only in magnitude; small orders command our utmost care and skill just as do large orders. CAMERON quality applies to every coil or segment that we can make, as well as to every commutator we build. That's why so many electric railway men rely absolutely on our name.

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Use them in your terminals—
PEREY TURNSTILES or PASSIMETERS
Faster than the ticket seller

Perey Manufacturing Co., Inc.
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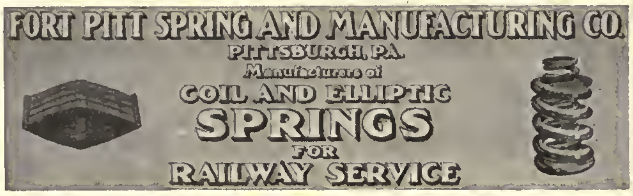

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PITTSBURGH, PA.
Manufacturers of
COIL AND ELLIPTIC
SPRINGS
FOR
RAILWAY SERVICE

J.H.WILLIAMS & CO
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Brooklyn · Buffalo · Chicago

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Eliminate Accidents

Send for Catalogue No. 18

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Collamer Ave. and Nickel Plate Railroad, Cleveland, O.

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A Chain Hoist that excels in every feature. It has Planetary Gears, Steel Parts, 3½ to 1 factor of Safety. It's the only Block that carries a five-year guarantee.

FORD CHAIN BLOCK CO.
Second and Diamond Sts., Philadelphia

SAMSON SPOT WATERPROOFED TROLLEY CORD

Trade Mark Reg. U. S. Pat. Off.
Made of extra quality stock firmly braided and smoothly finished.
Carefully inspected and guaranteed free from flaws.
Samples and information gladly sent.
SAMSON CORDAGE WORKS, BOSTON, MASS.

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ELECTRIC RAILWAY JOURNAL
EVERY WEEK

ELECTRIC RAILWAY JOURNAL

Think "SEARCHLIGHT" First

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POSITIONS WANTED—Evening work wanted, tutoring and other undisplayed ads of individuals looking for employment, 4 cents a word, minimum 75 cents, payable in advance.

ADD 5 WORDS for box number in undisplayed ads if replies are to any of our offices. There is no extra charge for forwarding replies.

DISCOUNT OF 10% if one payment is made in advance for 4 consecutive insertions of undisplayed ad.

ADS IN DISPLAY TYPE—Space is sold by the inch (30 in. to a page), the price depending upon total space used within a year, some space to be used each issue.

RATE PER INCH for ads in display space:

1 to 3 in., $4.50 an in.
4 to 7 in., $4.30 an in.
8 to 14 in., $4.10 an in.
15 to 29 in., $3.90 an in.
30 to 49 in., $3.80 an in.
50 to 99 in., $3.70 an in.

POSITIONS VACANT

EMPLOYMENT

POSITIONS WANTED

POSITIONS VACANT

A combined property located in Great Lakes district is seeking the services of a man equipped to successfully manage its street and interurban railway business. Give full information with your application. P-847, Elec. Ry. Journal, Old Colony Bldg., Chicago.

CARPENTER foreman and blacksmith foreman wanted by large electric railway company in Middle West. State experience and references and advise salary required. P-849, Elec. Ry. Journal, Old Colony Bldg., Chicago.

LINEMAN wanted for electrical railway in northwestern Pennsylvania. One who can and will take care of overhead lines and who is willing to do other work if requested. Married man preferred. Address, telling us what you can do and salary expected, Cleveland & Erie Railway Co., Box 43, Girard, Pa.

MECHANICAL and electrical engineer wanted for responsible executive position. Street railway in medium size city. Give salaries earned and full account of experience with other necessary information first letter. P-842, Elec. Ry. Journal, Real Estate Trust Bldg., Phila.

WE have an opening in our organization for a competent public utility accountant. One having experience in light, gas and street railway accounting preferred. P-843, Elec. Ry. Journal, Old Colony Bldg., Chicago.

POSITIONS WANTED

CONSTRUCTION superintendent, who can take a crew of laborers and make them into mechanics, introduce novel methods on your work and make that losing job profitable; broad experience in construction lines, grading track, concrete, electrification and rigging; age 46; expert all classes of machinery; go anywhere; salary $400 or nominal salary and percentage of profits. PW-85, Elec. Ry. Journal.

EXPERIENCED outside construction man desires position in way of electric railway, lighting, underground and submarine cables. Most experience in city of 200,000 population. Can produce results. PW-828, Elec. Ry. Journal, Real Estate Trust Bldg., Philadelphia.

MASTER mechanic on Eastern electric railway desires change of position preferably in the West. Have had 20 years' experience on high and low speed equipments; both straight and multiple control. Have A-1 method of handling labor; understand fully the meaning of the words "efficiency" and "economy." PW-846, Elec. Ry. Journal.

YOUNG man, experienced as inspector, dispatcher, time tables and chief clerk in transportation department, now employed, desires change with chances for advancement. Prefer Middle West or South. PW-845, Elec. Ry. Journal, Real Estate Trust Bldg., Philadelphia.

SUPERINTENDENT of transportation, at present employed in this capacity, desires a change in near future; age 41; 17 years' experience on large city and suburban properties, possessing full knowledge of all details of transportation; capable of taking over any property large or small and getting results; successful in dealing with public and labor. Will consider any property that requires effort and ability to build up. PW-848, Elec. Ry. Journal, Old Colony Bldg., Chicago.

SUPERINTENDENT of transportation desires making a change. Will consider any city or suburban property that requires ability and extra effort to build up; 41 years of age, clean, capable; nearly 18 years' experience on large city and suburban properties, possessing full knowledge of all details of transportation; successful in dealing with public and employees; best of references as to character and ability. PW-844, Elec. Ry. Journal, Old Colony Bldg., Chicago.

FOR SALE

Shares For Sale

10 shares Co-operative Society of America, $350; 10 Elgin Motor Co., $70. Phone, Englewood 187, L. J. Mather, 6807 Union Ave., Chicago, Ill.

WANTED

One Second-Hand

Bolt Threading Machine

to thread Bolts up to 2 in.

Advise lowest cash price.

Philadelphia & Western Railway Co.
Norristown, Pa.

EVERYTHING FOR TRACK

New and Relaying Rail

FITTINGS AND TOOLS

TRACK SPECIALTIES CO.
29 Broadway, New York City.

For 20 Years

we have been

Buying and Selling

Second-Hand Cars

Trucks and Motors

At Your Service

ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa.

One combination electric weld and copper weld rail

BONDING CAR

Complete with cast weld outfit for 550-600 volts. Bonding car equipped with West. equipment, and is in A1 condition. Sold subject to agreement with Electric Improvement Company. Your best bid solicited.

W. A. LOVEJOY, P. A.
Atlantic Shore Railway, Kennebunk, Maine

700 tons new 9 in.

GIRDER RAIL

Penna. Steel Co. Section 228, 107 lb. to the yard. Attractive price upon application. Subject to R. W. Hunt & Company's Inspection. Prompt shipment.

H. M. FOSTER COMPANY
Continental Building, Baltimore, Md.

COMPLETE POWER PLANT

FOR SALE

1—500 h.p. Westinghouse Compound Engine, Direct Connected to 550 volt Generator.

2—200 h.p. Harrisburg Engines, Belt Connected to Westinghouse Generators.

1—B & W Boiler, 2 Keeler Boilers, Water Heaters, Pumps, Piping, Switchboards and etc.

All in first class operating condition. Immediate delivery. Make us an offer.

The Lewistown & Reedsville Electric Railway Co., Lewistown, Pa.

NEW—80-LB. RAIL and ACCESSORIES

Angle Bars, Spikes, Bolts and Nuts Complete

FOR SALE

A.R.A. "TYPE B" RAIL

Approximately 30,000 gross tons—standard lengths

Stored at Kearney, New Jersey

We buy electric and steam railways that are to be dismantled

HYMAN-MICHAELS COMPANY

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1324-1326 Woolworth Bldg.

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St. Louis Office:
2115 Railway Exchange Bldg.

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MOTORS

One Westinghouse 15 hp., 500 volt, Speed 1150. One Crocker-Wheeler 3 hp., 500 volt, Speed 1875 Direct Current Motors with starters, etc. Nearly good as new.

H. G. YOUNG, *City Electrician*
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New—Used—Rebuilt

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for construction and industrial work

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FOR SALE—IMMEDIATE SHIPMENT

200 kw. Genl. Electric Belted Railway Generator; 525/575 volts, 348 Amps., 425 rpm.; type MP, class 6-200-425, form H; complete with sliding base, pulley and generator panel; first class condition.

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75 hp. Westgh. 550/600 Volt Direct Current Motor; Form 12, Type S; Direct Coupled to 50 kw. Direct Current Booster, 250/182 Volts; 400/200 Amps, 950 r.p.m.; Set is 2 Bearings; Both machines mounted on same iron base and are practically new.

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415 Pine St., Saint Louis

FOR SALE

Eight G. E.

DYNAMOTORS

first-class condition. Car type 1200-600 V. 15 Amps

Charleston Interurban Railroad Co.
Charleston, W. Va.

An Unusual Opportunity

Large Stock of New Repair Parts
Consisting of

G. E. 67 Armature Cores
G. E. 67 Field Coils
G. E. 67 Commutators
G. E. 67 Axle Bearings
G. E. 67 Armature Bearings

Now is the time for you to stock up for emergency at attractive prices. Write, phone or wire for what you need.

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1 Beacon Street, Boston, Mass.

Address Purchasing Department

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REBUILT

ELECTRIC MOTORS

REWINDING
REPAIRING

NEW A.C. MOTORS ¼ to 15 H.P.—LARGE STOCK USED MOTORS
EXCELLENT REPAIR SERVICE ON ANY SIZE OR TYPE

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EST. 1895 **4732-4-6 ST. CLAIR AVE., CLEVELAND O.** ***INC. 1918***

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STEAM TURBO GENERATING SETS

1—10,000 kw. (13,500 kva.) Westg. 3 ph., 60 cy., 13200 v., 1800 r.p.m. Turbo Unit with Le Blanc Jet Condenser.
1—1500 kva. Gen. Elec. Curtis 25 cycle turbo unit, 3 ph., 1500 r.p.m., 370 volts, 175 lb. steam pressure.
1—1500 kw. 1875 kva. Allis Chal. horiz. turbo 3 ph. 60 cy. 2300 v. 3800 r.p.m. condensing.
1—1000 kw. 1250 kva. Gen. Elec. horiz. turbo 3 ph. 60 cy. 2300 v. 3600 r.p.m. condensing.
1—1000 kw. G. E. horiz. turbo, 3 ph. 60 cy. 480 vs. 3600 r.p.m. for non-condensing duty, BRAND NEW.
1—500 kw. 625 kva. Gen. Elec. horiz. turbo 3 ph. 60 cy. 2300 v. 3600 r.p.m. condensing.
1—400 kw. Westg., 3 ph., 60 cy., 2200 v., 3800 r.p.m. turbo unit.

FREQUENCY CHANGER SETS

1—500 kw., G. E., 3 ph., 60 cy., 2300 v., 750 r.p.m. generator dir. ctd. to 700 hp., 3 ph., 25 cy., 13200 v., 750 r.p.m. motor.
1—500 kw., G.E., 3 ph., 60 cy., 4150 v., 300 r.p.m. generator dir. ctd. to 800 hp., 3 ph., 25 cy., 9000 v., 300 r.p.m. motor.

MOTOR GENERATOR SETS

1—1000 kw., Westg., 135/350 v., 204 r.p.m. generator dir. ctd. to 1400 hp., 3 ph., 60 cy., 6600/4000 v., 304 r.p.m. motor.
1—200 kw., G. E., 250 v., 900 r.p.m. generator dir. ctd. to 300 hp., 3 ph., 60 cy., 2400 v., 900 r.p.m. motor.
2—100 kw., Westg., 6 pole, 600 v., gen., each dir. ctd. to 150 hp., 3 ph., 25 cy. motor. These are self contained units on cast iron sub-bases.

ROTARY CONVERTERS

1—500 kw., Westg., rotary, 6 ph., 25 cy., 440 v., A.C., 600 v., D.C., 600 r.p.m.
1—500 kw., Gen. Elec., rotary, 600 volt, 60 cy., 1200 r.p.m.
2—300 kw., Westg., 3 ph., 60 cy., 370 v., A.C., 600 v., D.C., 600 r.p.m.
2—200 kw., G. E., 25 cy., 370 v., A.C., 600 v., D.C., 750 r.p.m.
1—150 kw., Westg., 3 ph., 60 cy., 370 v., A.C., 575 v., D.C., 720 r.p.m.
3—150 kw., Gen. Elec., 25 cy., 370 v., A.C., 600 v., D.C., 750 r.p.m.

TRANSFORMERS—25 CY.

6—500 kva., G. E., 13200 prim., 480 secy.
3—200 kva., Westg., 16600 v., prim., 460 secy.
3—200 kw., G. E., 6450 v., prim., 170 secy.
3—185 kva., G. E., 2300 v., prim., 430 secy.
3—150 kw., G. E., 6000 v., prim., 83 secy.
3—125 kw., Westg., 2300 v., prim., 220 secy.
2—75 kva., G. E., 13800 v., prim., 115/230 secy.
3—50 kva., G. E., 13800 v., prim., 115/230 secy.

TRANSFORMERS—60 CY.

1—7500 kva., Westg., 44000/23000-13500 vs.
3—2000 kva., G. E., 66000 v., prim., 6600-13200/22000 v., Y secy.
3—2000 kva., G. E., 66000-2300/4000 Y vs.
2—1250 kva., 3 ph., G. E., 36400/13300 prim., 2400/2200 v., secy.
4—750 kw., G. E., 44000/43000/42000 prim., 6600 secy.
6—600 kva., G. E., 33000/13300 volts.
3—400 kva., Allis-Chalmers, 6000-440 vs.
3—200 kva., G. E., 2200 prim., 370 secy.
3—150 kva., G. E., 6600-130/340 volts.
4—150 kw., Allis-Chalmers, 33000 v., prim., 2300 secy.
6—110 kw., G. E., 14500-13050 v., prim., 430-286-143 v., secy.
3—100 kw., G. E., 8200 v., prim., 3300 secy.
2—100 kw., G. E., 6600/5740 prim., 3760/2400 secy.
3—100 kw., G. E., 6600 v., prim., 605/504 secy.
3—100 kva., Westg., 11000-600 volts.
3—100 kw., Westg., 440 v., prim., 320 secy.
3—75 kva., G. E., 11000/9000-6600 vs.
3—75 kva., G. E., 2300 v., prim., 370 secy.
3—75 kva., Allis-Chal., 6600 v., prim., 440 secy.
3—55 kw., G. E., 3300/2070-370/330/165 vs.
3—50 kva., Westg., 6600/6300/6000 v., prim., 440/220 secy.
3—50 kw., Westg., 5000/6600 v., prim., 1000/1100/2000/2300 v., secy.

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Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

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Chicago Pneumatic Tool Co.
Ingersoll-Rand Co.

Air Receivers
Chicago Pneumatic Tool Co.
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Anchors, Guy
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Angle Bars
Lackawanna Steel Co.

Automobiles and Buses
Brill Co., The J. G.

Axles
Bemis Car Truck Co.
Carnegie Steel Co.
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Axles, Car Wheel
Bemis Car Truck Co.
Brill Co., The J. G.
Standard Steel Works Co.
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More-Jones Brass & Metal Co.

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Columbia M. W. & M. I. Co.
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Boilers
Babcock & Wilcox Co.

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National Tube Co.

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Copper Clad Steel Co.
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Westinghouse Elec. & Mfg. Co.

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National Ry. Appliance Co.
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Brake Shoes
Amer. Brake Shoe & Fdry. Co.
Barbour-Stockwell Co.
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Brill Co., The J. G.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

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Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
National Brake Co.
Safety Car Devices Co.
St. Louis Car Co.
Westinghouse Traction Brake Co.

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Zelnicker, W. A., Supply Co., Inc.

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Corliss Carbon Co.
General Electric Co.
Jeandron, W. J.
Morganite Brush Co., Inc.
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Brill Co., J. G., The

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Irvington Varnish & Insulator Co.

Cambric, Yellow and Black Varnished
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Carbon Brushes (See Brushes, Carbon)

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Electric Equipment Co.

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Cleveland Armature Works
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Cleveland Armature Works
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Compressors, Gas
Ingersoll-Rand Co.

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Massey Concrete Products Corp.

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Condensers
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Schutte & Koerting Co.
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Silver Lake Co.

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Samson Cordage Works
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Crossing Foundations
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Crossing Signals (See Signals, Crossing)

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Crossings, Track (See Track, Special Work)

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Massey Concrete Products Co.

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Canton Culvert & Silo Co.

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Wish Service, P. Edward

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National Pneumatic Co., Inc.
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General Electric Co.

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Ingersoll-Rand Co.

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Chicago Pneumatic Tool Co.
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Niles-Bement-Pond Co.
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Zelnicker Supply Co., Inc., Walter A.

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Hemphill & Wells
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Jacobs & Co., J. L.
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Kelly, Cooke & Co.
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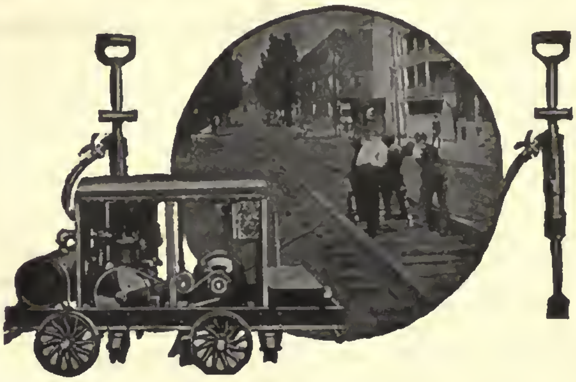

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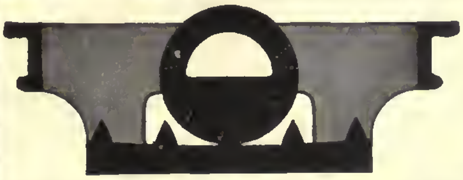

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Standard Steel Works Co.
Williams & Co., J. H.

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Johns-Manville Co., Inc.
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Ohio Brass Co.

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Smith Heater Co. Peter

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Smith Heater Co., Peter

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Irvington Varnish & Insulator Co.

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Westinghouse Elec. & Mfg. Co.

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Westinghouse Elec. & Mfg. Co.

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Hubbard & Co.
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Electric Service Supplies Co.
General Electric Co
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Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse Traction Brake Co.

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Standard Steel Works Co.
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Drew Elec. & Mfg. Co.

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Duncan Lumber Co.
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Page & Hill Co.
Southern Cypress Mfgrs. Assn.

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Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
National Tube Co.
Nuttall Co., R. D.

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Electric Railway Equipment Co.
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Duncan Lumber Co.
Page & Hill Co.

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General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

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International Register Co., The
Wood Co., Chas. N.

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Foster Co., L. B.
Lackawanna Steel Co.

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Lackawanna Steel Co.

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Zelnicker, Walter A., Supply Co., Inc.

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Electric Service Supplies Co.
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Electric Service Supplies Co.
International Register Co., The
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Carnegie Steel Co.
Lackawanna Steel Co.

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Electric Service Supplies Co.

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Electric Service Supplies Co.

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Columbia M. W. & M. I. Co.

Resistance, Wire and Tube
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Westinghouse Elec. & Mfg. Co.

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Westinghouse Elec. & Mfg. Co.

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Pantasote Co.

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National Metal Molding Co.

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Belden Mfg. Co.

Sanders, Track
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Ohio Brass Co.
St. Louis Car Co

Sash Fixtures, Car
Brill Co., The J. G

Scrapers, Track (See Cleaners and Scrapers, Track)

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Pantasote Co.

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"Noark" Fuses do not "freeze up"

This is the result of several noteworthy features of design and construction.

The link, for instance, is of the drop-out type, which insures that under the most severe short circuit conditions an instantaneous opening of the circuit will result, but in addition, permits only the minimum amount of metal to fuse and vaporize.

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"Noark" Fuses are simple in construction

When a fuse blows—it is an easy matter to take it apart. The sure-grip knurled brass caps are unscrewed from the ends; the solid slotted disc washers are slipped off the knife blades; the lock washers are removed as the knife blades are withdrawn and the fused link is replaced with a new one.

"Noark" Fuses are renewable innumerable times

"Noark" Fuse Cartridges are of specially manufactured horn fibre, with machined metal to metal end fittings. The washers are ground to size, not just stamped out. There are no packing washers to renew after every operation.

"Noark" Fuses are properly vented

The venting of "Noark" Fuses is accomplished through the scientifically arranged gas paths without noise or flash.

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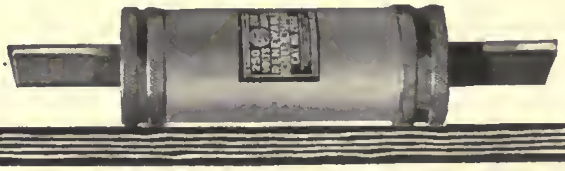

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ELECTRICAL MATERIALS

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Hyman Michaels Co.
Zelnicker Supply Co., Inc., Walter A.

Shades, Vestibule
Brill Co., The J. G

Shovels
Brill Co., The J. G.
Hubbard & Co.

Signals, Car Starting
Consolidated Car Heating Co.
Electric Service Supplies Co.
National Pneumatic Co., Inc.

Signal Systems, Block
Electric Service Supplies Co.
Nachod Signal Co., Inc.
U. S. Electric Signal Co.
Wood Co., Chas. N.

Signal Systems, Highway Crossing
Nachod Signal Co., Inc.
U. S. Electric Signal Co.

Slack Adjusters (See Brake Adjusters)

Slag
Carnegie Steel Co.

Sleet Wheels and Cutters
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Drew Electric & Mfg. Co.
Electric Railway Equipment Co.
Nuttall Co., R. D.

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Columbia M. W. & M. I. Co.
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McGuire-Cummings Mfg. Co.

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National Metal Molding Co.

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Frankel Connector Co.

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Irvington Varnish & Insulator Co.

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Chicago Pneumatic Tool Co.

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Chicago Pneumatic Tool Co.

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Lackawanna Steel Co.

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Westinghouse Elec. & Mfg. Co.

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Schutte & Koerting Co.

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American Steel & Wire Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Fort Pitt Spring & Mfg. Co.
Standard Steel Works Co.

Sprinklers, Track and Road
Brill Co., The J. G.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.

Steel Castings
Wharton, Jr., & Co., Wm.

Steps, Car
American Mason Safety Tread Co.

Tubing, Steel
National Tube Co.

Stokers, Mechanical
Babcock & Wilcox Co.
Westinghouse Elec. & Mfg. Co.

Storage Batteries (See Batteries, Storage)

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Copper Clad Steel Co.
Roebling's Sons Co., J. A.

Structural Steel
Lackawanna Steel Co.

Superheaters
Babcock & Wilcox Co.
Power Specialty Co.

Sweepers, Snow (See Snow Plows, Sweepers and Brooms)

Switch Stands
Ramapo Iron Works

Switches, Track (See Track Special Work)

Switchboxes
Chicago Fuse Mfg. Co.

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Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Tampers, Tie
Ingersoll-Rand Co.

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Telephones and Parts
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Terminals, Cable
Standard Underground Cable Co.

Testing, Commercial and Electrical
Elec'l Testing Laboratories

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Railway Utility Co.
Smith Heater Co., Peter

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Electric Service Supplies Co.

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Globe Ticket Co.

Tie Plates
Lackawanna Steel Co.

Ties, Mechanical
Dayton Mechanical Tie Co.

Ties and Tie Rods, Steel
Barbour-Stockwell Co.
Carnegie Steel Co.
International Steel Tie Co.

Ties, Wood Cross (See Poles, Ties, Posts, etc.)

Tongue Switches
Wharton, Jr., & Co., Wm.

Tool Holders
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Putting Pulling Power into the Business Paper

FOR the third time since January an *Electrical World* editor is traveling from New York to California in active co-operation with the National Electric Light Association. Three other *Electrical World* editors have made the trip from the Atlantic to the Pacific in the same period, scouring up and down the states between for facts and figures of essential importance to electrical engineering and commercial interests.

Out of the power plant world a demand, multiplied and insistent, comes for information on oil engines. As a result, a noted authority on Diesel and semi-Diesel engines is added to the editorial staff of *Power*. He is sent out to visit all important installations of these engines throughout the country. Over three months of travel and study will be spent by this *Power* editor solely to gain for *Power* readers a fuller knowledge of oil engines operating performance under all possible service applications and conditions.

A McGRAW-HILL man representing *Engineering & Mining Journal*, after having been forced out of Mexico by warring factions, has again plunged into that turbulent country to learn and report actual conditions affecting mining and oil well operations and prospects and equipment opportunities.

An editor of *Ingenieria Internacional* comes back from a long trip through the countries of South America bringing much valuable data on trade conditions, engineering and industrial development, and equipment requirements.

American Machinist recently sent one of its executives on a tour of Europe to study the metal-working industries abroad for the benefit of similar industries and machine-tool manufacturers at home.

An editor of *Engineering News-Record* also has just returned from Europe where he has been investigating engineering practice and equipment usage and needs in the construction field.

General departure from rule-of-thumb methods is an urgent need of the chemically controlled industries. To this end *Chemical & Metallurgical Engineering* has made an exhaustive investigation on which is founded one of the most significant and important issues of any publication in the engineering and industrial press—the September 8th "Convention" issue of *Chemical & Metallurgical Engineering*.

Electrification of steam railroads is a question pregnant with transportation improvement possibilities in this country. So an *Electric Railway Journal* editor recently made an extended trip over the system of the Chicago, Milwaukee & St. Paul R.R. to study this famous achievement in railroad development. Returning east this editor made a sweeping tour of Canada, getting data vitally interesting to American electric railway men and builders of electric railway material on today's methods, equipment, plans and outlook of the foremost Canadian electric railways.

The extraordinary success of *Electrical Merchandising* since its inauguration in 1907 is largely due to the indefatigable field work of the editors. These editors comb the continent with their journeys. They are constantly in personal contact with the electrical dealers, jobbers and contractors. They meet them at their conventions, clubs, clambakes, summer camps, offices, stores, warehouses and homes. They are keeping in touch with movements and materials and markets and methods and men—helping these men individually and through their organization.

Industrial, agricultural and commercial development of the West beyond the Rockies depends in large measure on the development of electricity from water power. To promote the industrial development of these great States with their specialized problem, McGRAW-HILL service to the electrical field was expanded in September, 1919, by the purchase of the *Journal of Electricity*. The acquisition of this publication demonstrates that McGRAW-HILL service, when conditions require, is intensive, as well as comprehensive.

As an editor of *Coal Age* recently wrote, "Read your *Coal Age* closely, and you will see that no stone is being left unturned to make *Coal Age* a mirror of the industry, to make the achievements and experience of some enterprising individual somewhere the pivotal point for an advance of the entire craft."

THIS is the policy that governs ALL McGRAW-HILL publications. It picks the ablest men as editors. It sends them out into the fields served by those publications. It bids them seek the problems of those fields. And through their publications these editors lead and co-ordinate the search for the answer to those problems.

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Engineering & Mining Journal

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Chemical & Metallurgical Engineering

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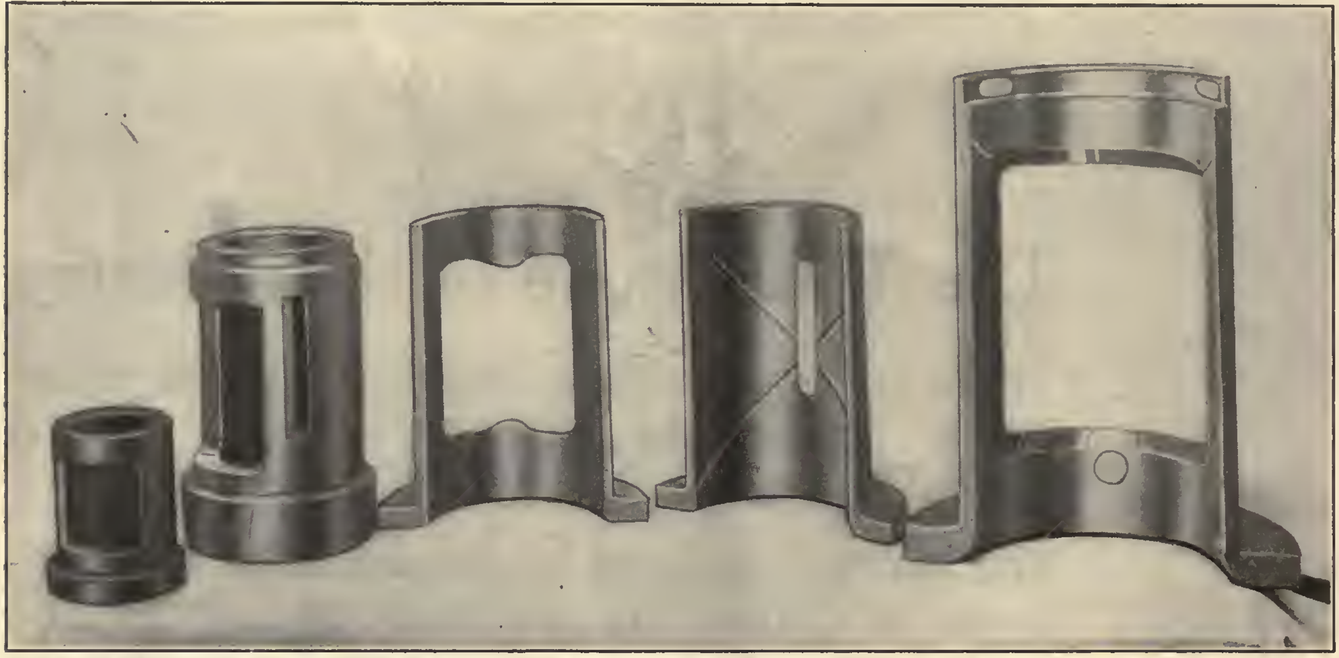

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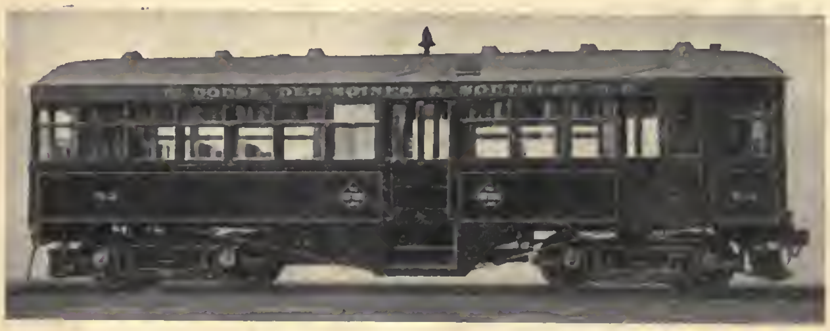

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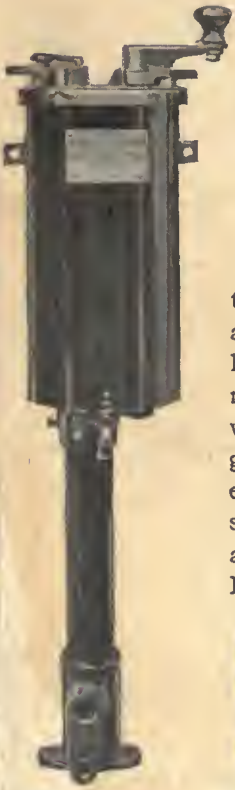

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